

# The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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## The 17-Ton Steam Hammer of Park, Bro. & Co., Pittsburgh.

We give in the accompanying engravings illustrations showing the new 17-ton steam hammer now being constructed for Messrs. Park, Bro. & Co. by Messrs. Wm. B. Bement & Son, of Philadelphia. The steam hammer will be the largest ever built in the country. It has a cylinder of 40 inches bore, with a stroke of 9 feet, and weighs 11 tons. The piston rod will be 11 inches in diameter;

used in construction, including anvil block, dies, holding-down bolts, &c., is about 525,000 pounds. The operator will stand on the ground level, and can allow the ram to fall by its gravity alone, or can add the steam pressure above the piston when the work requires it.

The base plate occupies a space on the ground 13 x 26 feet, and the entire height from ground level is a little more than 32 feet. The operation of the hammer and the means adopted for controlling the blow will

Co., at Creusot, France, a model of which was exhibited at the Paris Exposition of 1878. It was stated some time ago that Krupp intended to build a 120-ton hammer, but as yet it has not been built.

## Whitney's Improvement in Firearms.

The first considerable improvement which this manufacture received in this country was given it by the ingenuity and industry of Eli Whitney, the inventor of the cotton

upon which the national armories were afterward arranged, and many of his improvements were transferred by his workmen to other establishments, and have become common property. His improvements in the manufacture of arms, it is generally conceded, laid his country under permanent obligations by augmenting the means of national defense. It is satisfactory also to know that though defrauded of his just rights by a portion of the country most benefited by his previous invention, his talents

make "the same parts of different guns as much alike as the successive impressions of a copper-plate engraving," and left little for the skill of the workmen to accomplish. He thus found it easier to instruct green hands than to combat the prejudices of those instructed in the English system, where each workman made a certain part of the gun, which required operations often widely distinct in their nature.

At a recent meeting of the Academy of

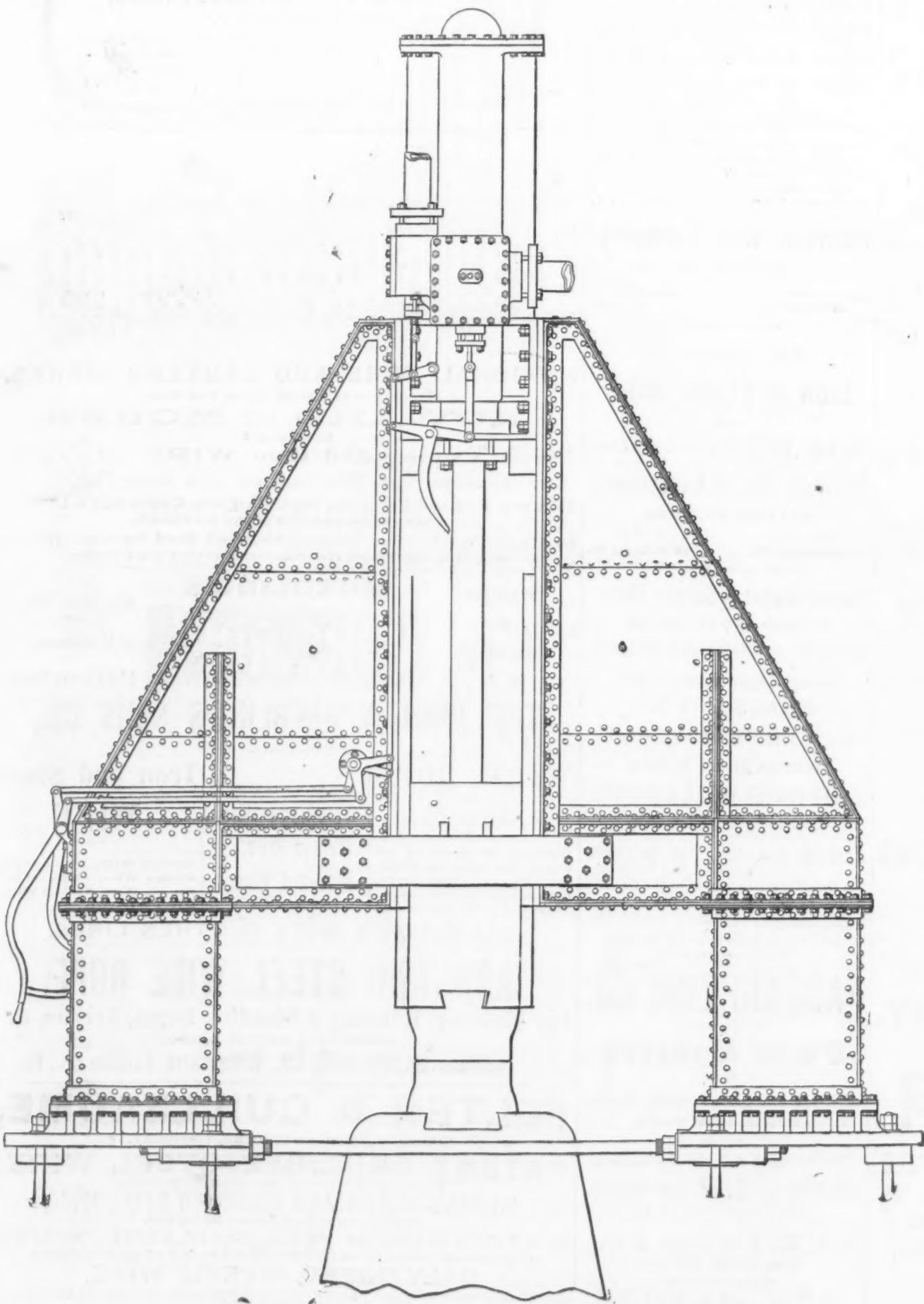


Fig. 1.—Elevation of 17-ton Steam Hammer.

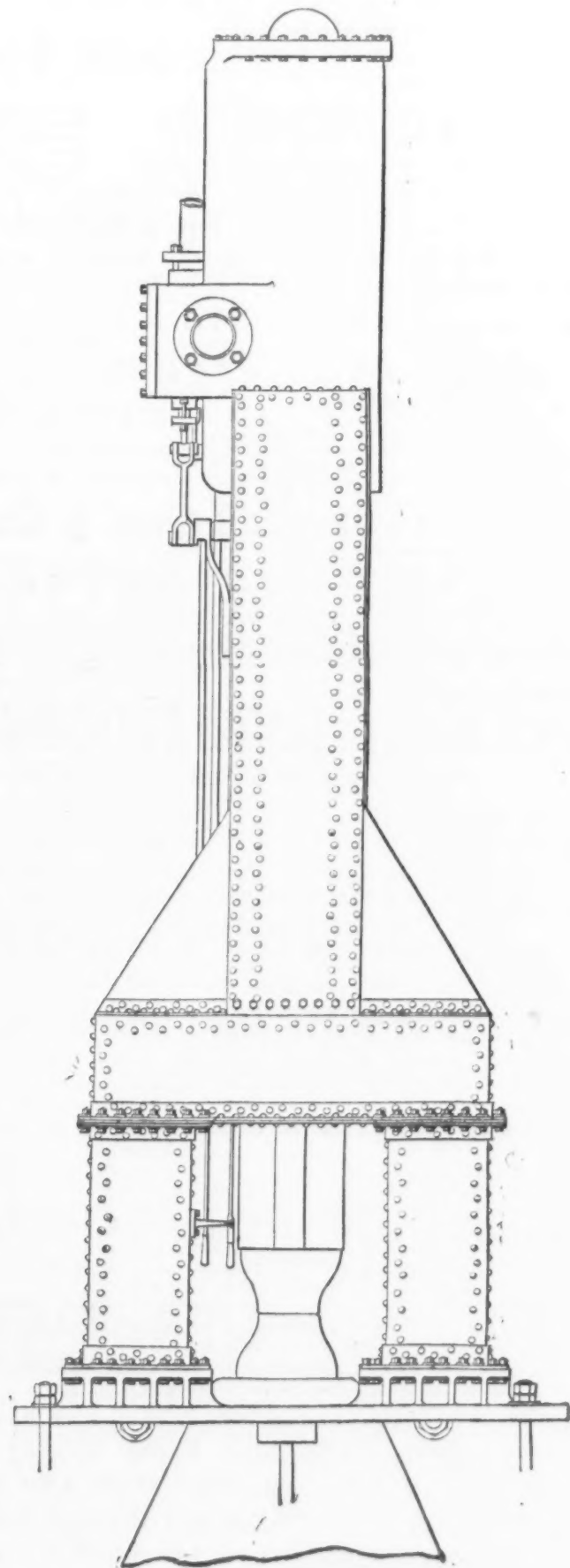


Fig. 2.—Side Elevation.

THE 17-TON DOUBLE ACTING STEAM HAMMER OF THE BLACK DIAMOND STEEL WORKS.

The tup is a Krupp steel forging, about 6½ feet long, 4 feet wide and 2½ feet thick. The combined weight of the vertically moving parts, including a die or "bit" suitable for heavy forgings, will be about 17 tons. When the steam is admitted on top of the piston it will produce an additional force or weight of about 50 tons, making 67 tons pressure in all when the ram or hammer is stationary. The framing is constructed entirely of wrought-iron plates, most of which are from seven-eighths of an inch to 1½ inches in thickness, a few, however, being much thicker. The plates are joined by rivets and bolts with heavy straps and angle iron. The total weight of iron and steel

be readily understood by reference to our drawings. When it is completed and has been in operation, we may have occasion to give some additional details.

This is the largest hammer ever built in this country, and with it Park, Bro. & Co. will be enabled to execute orders for heavy cast-steel shafts and other forgings, which orders heretofore had to be sent across the Atlantic. A great many steam hammers in this country run from 3 to 5 tons, and there may be about half a dozen which will reach 10 tons, but the average is not over 5 tons. In Europe there are many hammers of much larger size, one of the most notable being an 80-ton hammer erected by M. Schneider &

gin, who turned his attention, in 1798, to the manufacture of muskets, and made a contract for 10,000 stand at \$13.40 each, or \$134,000 for the whole. He proceeded to construct a factory at the present village of Whitneyville, Connecticut, where, through successive administrations from that of the elder Adams, repeated contracts for the supply of arms were made and fulfilled to the entire approbation of the government. The construction of his factory, and even of the commonest tools, which were devised by him for the prosecution of the business in a manner peculiar to himself, evinced the fertility of his genius and the precision of his mind. The buildings became the model

were not unrewarded in this department, though many experienced gun makers, who, about the same time, contracted for the supply of muskets, which they attempted to make in the English method, were ruined by their engagements. The difficulties encountered at that time by the undeveloped state of many of the mechanic arts were overcome by the accuracy and dispatch of his machinery and tools, much of which was adapted to other manufactures of steel and iron, and may still be recognized in the leading workshops of the country.

Prof. Ohmstead, from whose memoirs we have obtained the foregoing facts, states that Whitney contrived by machinery to

Sciences, Prof. Newberry, of Columbia College, gave an elaborate description of the antimony deposits lately discovered in Southern Utah. The mineral, a sulphide, is found cropping out in a thin stratum above the thick conglomerate rock of that section.

A trial of fire engines was recently made in this city, under the direction of the Fire Commissioners. The conditions were that the engines should be run for twelve consecutive hours, with a steam pressure limited at 100 pounds. Two of the three entered were dislodged, the third, manufactured by Messrs. Clapp & Jones, of Hudson, coming out best.



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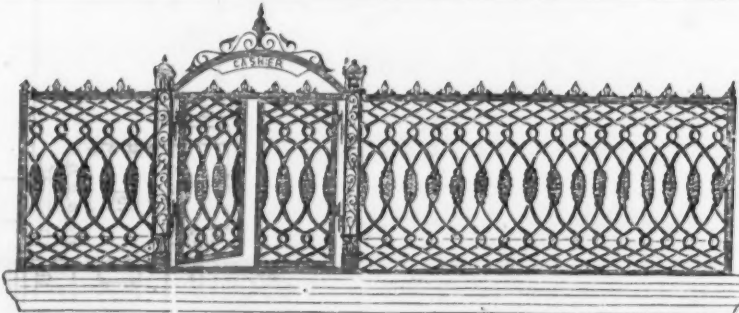
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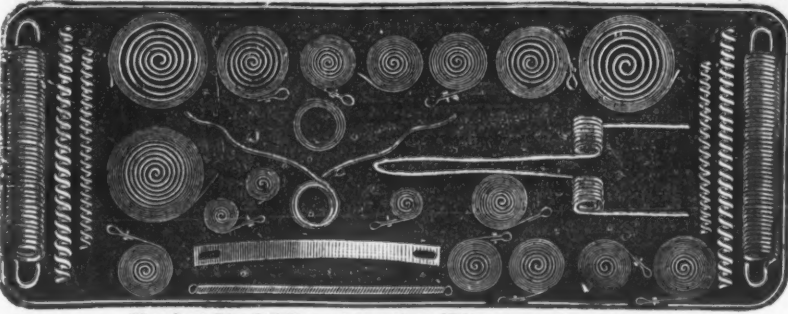
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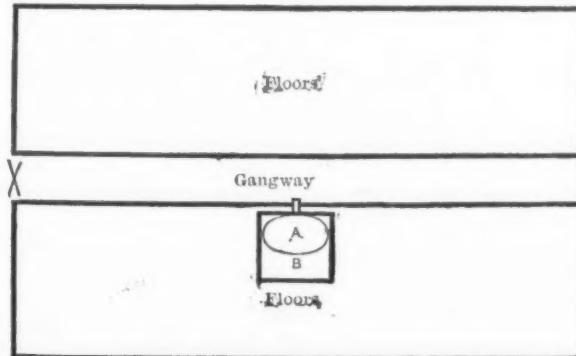
BY EDWARD KIRK.

STOVE FOUNDING.—STOVE FOUNDRY BUILD-  
INGS.

Stove foundry is the name given to a foundry in which stoves, ranges, grates and all the fixtures belonging to stoves are cast. When a foundry of this kind is started the first thing to be done is to erect the proper kind of a building. This building may be a brick or frame one according to the fancy of the builders, but a brick building is decidedly the better, for the floors of a foundry are always damp, and more or less dirt and rubbish is piled against the wall, both on the inside and outside. This dirt holds the dampness against the walls, and, if the building is a frame one, the sills and lower ends of the boards soon rot off and need repairing. Besides there is less risk of fire, and the sand will not freeze so readily in winter in a brick building as in a frame one. For a foundry of this kind the building need not be very strong, as there is little or no strain upon it. All that is necessary is to

warm weather, and closed when it rains or is cold. The foundry walls and beams should all be swept down and whitewashed at least once a year, and a foundry that is poorly lighted should be whitewashed oftener. A molder will put up more work in a well-lighted foundry than he can in a dark one, and he will make a better quality of work and have less discount.

The next important thing to be considered is the arrangement of the molding floors and gangways. In stove founding the molten iron is all carried in hand ladles from the cupola to the molds. The cupola should therefore be situated where it will be easiest of access from all parts of the foundry, and good wide gangways should lead from it to the molding floor of each molder. The gangways should be paved with brick or some other hard material, for if they are not paved they soon get full of hills and hollows, which makes the carrying of the molten iron more laborious as well as more dangerous. The arrangement of gangways varies according to the size and shape of the foundry and the mode of working adopted in the region where it is located. I

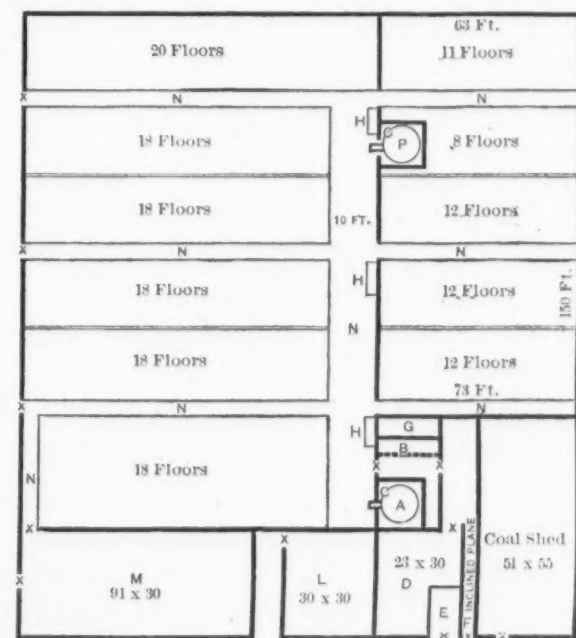


Practical Founding.—Fig. 17.—Floor Plan of A. Bradley & Co.'s Stove Foundry.

make the walls or frame heavy enough to support the roof, which should rest entirely upon them, so as to give free access to all parts of the foundry without the necessity of dodging around a lot of pillars or posts. A stove foundry requires to be lighter and better ventilated than any other kind of foundry, for the blacking which molders use to make the sand scale of the casting is dusted on the molds through a very fine muslin bag, making a great deal of dust. In a foundry where 25 or 50 molders are employed there are always some of them shaking blacking, and if the building is poorly ventilated this black dust will get so thick that the molders can scarcely see through it. Moreover, in casting and shaking out stove plate, more dust and steam are made than in any other kind of casting, for the large surface of the plate very rapidly dries the sand on both sides of it, and the plate also cools very quickly, so that unless it be taken out of the sand while it is warm, the thin scale of sand that has been dried draws dampness from the body of the sand, causing the plate to rust. In order to have a fine surface on the plate it must be taken out of the sand while hot, an operation which produces a great deal of dust and steam.

A large ventilator should be put on the roof the full length of the foundry, a roof with a steep pitch being better than a flat

give below the floor plans of two large stove foundries—one located in the eastern and the other in the western part of the country. In Fig. 17 is shown the floor plan of A. Bradley & Co.'s large stove foundry at Pittsburgh, Pa. Here only one large cupola is used, this being situated near the center of the foundry, as indicated by A. Under and back of it is a pit B for removing the dump. One large gangway 8 or 10 feet wide runs through the middle of the foundry throughout its entire length, and on each side of it are the molding floors. In Pittsburgh, and in most of the western foundries, two molders work on one sand heap—one on each side of it—and each puts up only one row of flasks. Each molding floor, or the molding floor for each sand heap, is 13 feet wide by 40 or 50 long, and in this foundry the end of each sand heap runs to the gangway, so that all the floors are connected with it. The main gangway is paved with brick, and it is a railroad track upon which runs a small car for removing the castings and gates from the foundry to the scratch room. In this foundry there are only two doors—one large one at the end of the gangway and a stock door at the back of the cupola, on a level with the cupola scaffold. This is one of the best arranged and most convenient foundries in the West. In the model foundry lately erected by Francis



A. Cupolas, 6 feet Shell.  
B. Pig Bed for Over Iron.  
C. Cupola Pit.  
D. Mill Room.  
E. Elevator.  
F. Inclined Plane to Return Empty Barrows.  
G. Ladle Oven.

H. Water Tanks.  
I. Engine and Boiler Room.  
M. Scratch Room.  
N. Gangway, 6 Feet Wide.—Main Gangway is Feet Wide.  
P. Cupola, 6 Foot Shell, in new Addition to Main Building.

In this figure the heavy lines represent the outside and partition walls, the light lines, the sand strips between the gangways and floors, and the light double lines the racks between floors on which follow boards are laid.

Practical Founding.—Fig. 18.—Floor Plan of Perry & Co.'s New Stove Foundry.

roof, as the steam and dust will escape through the ventilator more rapidly with the former. The side walls of a stove foundry should be at least 14 feet high, so as to give the dust and steam a good opportunity to escape rapidly.

The next important thing to be considered is plenty of light, for stove work is very fine work, and the least speck of loose sand left in the mold often condemns the casting. If the foundry be not well lighted the molder cannot see when a mold is clear, and many castings will be condemned on account of sand holes. Almost one-half of the foundry walls should be windows, and long, narrow windows, extending almost from the floor to the roof, are better than short, wide ones, as they give a more even light, while with the latter one part of a mold may be shaded by the other. A top light is better for this kind of work than a side light, and for this reason the sides of the ventilator should be all glass, and the window sashes should be arranged with ropes, so that they can be opened when a casting is being made, or in

Buckwalter & Co., at Royer's Ford, Pa., the floor plan is the same as in Bradley's foundry. In Fig. 18 is shown the floor plan of a large stove foundry lately erected by Perry & Co., at Sing Sing, N. Y. The main building is 126 x 176 feet and contains 110 floors, 6½ x 25 feet each. The addition is 63 and 73 x 150 feet, and contains 55 floors of the same size, making a total of 165 molding floors. This foundry is arranged to have the scratch room, engine and boiler room, coal shed, ladle oven and molding room all under the same roof, and the floor of the molding room is arranged to suit the Eastern style of working. In this only one molder works on a sand heap, putting up two or more rows of flasks. The molder does not require as long a floor as if he put up only one row of flasks. The average molding floor for the eastern style of working is 6½ feet wide by 25 feet long. For these short floors more gangways are required, in order that each floor may be reached without having to cross another.



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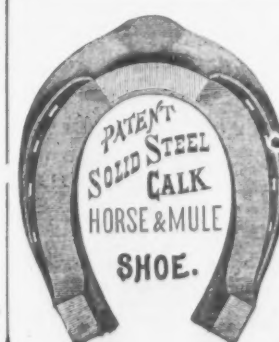
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A Trades Union Secretary on Practi-  
cal Study for Workmen.

Mr. R. Knight, the general secretary of  
the Boilermakers and Iron Shipbuilders' So-  
ciety, has just published for private circula-  
tion a book entitled the "Practical Boiler-  
maker, Iron Shipbuilder and Mast maker,"  
which contains a mass of practical informa-  
tion especially valuable to workmen in the  
iron trade. In the preface to his work Mr.  
Knight offers words of sound advice, which  
are deserving the serious consideration of  
all workmen anxious to give to their re-  
spective branches of industry that practical  
study so essential in these times of constant  
progress and keen competition. After ur-  
ging upon young men who want to become  
good mechanics that they can only rise to  
that position by striving for it by patient  
study and hard work, Mr. Knight proceeds:  
"I am aware that the gradual develop-  
ment of capital, the absorption of small mas-  
ters by large employers, a general break-  
down of the apprentices system, the intro-  
duction of machinery, the sub-divisions  
of labor, and the constant hurry and drive  
of modern industrial employment, have all  
tended to make it most difficult for the young  
men of the present day engaged in skilled  
labor to acquire anything like a competent  
knowledge of their particular trades. It is  
almost impossible, as a rule, for a young be-  
ginner to apply any scientific knowledge he  
may have gained in the workshop, and the  
workshop is not the place in the present day  
where a young man can possibly learn a  
great deal connected with the trade with  
which it is most important he should be  
thoroughly acquainted. The question arises,  
then, what is the remedy for this? One of  
the courses I would strongly recommend  
to all those who want to acquire a  
better knowledge than they already  
possess of their trade is the following: Get  
the best books that you can which treat  
of the subject, and carefully study the  
same in your quiet homes after the day's  
work is done. Purchase a few sheets of card  
board and a few drawing instruments, then  
carefully strike out the diagrams. [And in  
his book Mr. Knight gives a large number  
of useful diagrams, the accuracy of which  
he has tested either at the workshop or at  
home.] First the drawings should be in  
flat, then they should be cut out, and formed  
into models. By such a method the student  
would see how to do the actual work as well  
as read about it, and the principle of the  
whole would be so impressed upon the mind  
that it would not easily be forgotten."  
Mr. Knight adds that he pursued studies  
according to this plan for many years, and  
found them of the greatest benefit. If the  
plan were tried it would be found of im-  
mense help, both to arouse interest and to  
fix the mind on the subject under considera-  
tion. In fact, the student would find it a  
pleasure to pursue his studies when he be-  
came acquainted with the principles which  
underlie the correct method of marking out  
his work, to know in fact the "reason  
why" it has to be done in this or that  
way, and not in another. It would not  
only help to make him a workman worth  
more to his employer, but it would make  
him something more than a machine, enab-  
ling him to take both a pride and an intelli-  
gent interest in the work on which he was  
engaged.

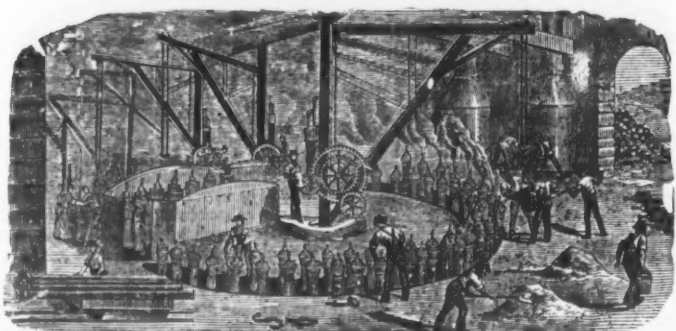
Brisbane, Australia, has its white elephant,  
the Victoria swing bridge, an iron structure  
which spans the river and connects the city  
with a straggling village known as South  
Brisbane. Ipswich is a town at the head of  
the navigable part of the river, about 25  
miles west of Brisbane; its population is  
about 8000, less than one-third of the people  
in Brisbane. The Ipswich folk, however,  
thought that their town ought to be the  
capital, and when Brisbane arranged for an  
iron bridge over the river, Ipswich regarded  
it as a ruse to get a barrier across which  
would intercept the shipping going up to  
Ipswich. The fact is, the river is so shallow  
above the bridge that only small craft draw-  
ing but little water can ascend to Ipswich,  
and to deepen the rocky bed of the river for  
25 miles would be an undertaking second  
only in magnitude to the Suez Canal. But  
Ipswich remained implacable, and so a swing  
bridge was constructed at enormous cost.  
The Marquis of Normanby formally opened  
the bridge on June, 1874, and the "swing"  
has been opened once since to see if it was  
in working order. Ipswich was pacified,  
and the people have to pay the interest on  
\$600,000, the cost of the bridge; 1190 tons  
of cast and 911 tons of wrought iron were  
used in constructing the Victoria bridge,  
which was manufactured and erected by  
Messrs. Peto, Brassey & Betts, of Birken-  
head, from the designs of Messrs. Robinson  
& L'Anson, of Darlington. The distance  
between abutments is 1013 feet, and the  
entire length of the bridge is 1080 feet.  
There are 13 spans, viz., a double armed  
swing span of 170 feet, 9 spans of 82 feet,  
and two spans of 52 feet 6 inches. Double  
columns of cast-iron cylinders form the piers,  
on which rest lattice girders 9 feet deep.  
The roadway between the girders is 30 feet  
clear, and a footway 6 feet wide, supported  
by cantilevers, is carried along each side of  
the bridge level with the roadway. The  
bridge was commenced in 1863, and was not  
completed until 11 years later. The works  
were entirely suspended for a long period,  
the ironwork fell into the river, and there  
seemed to have found its last resting place,  
and the engineer, Mr. Thomas Oldham, died.  
At last litigation was ended, Mr. J. R. Jones  
was appointed superintending engineer, and  
the work was re-commenced and completed  
six years since.

The new British steamer *Conventina*,  
which lately discharged a cargo of 2200  
tons Spanish iron ore from P.uman at  
Philadelphia, is a novelty in construction.  
Her keel is full 3 x 6 feet, which gives two  
solid bottoms, and between these are carried  
the ballast tanks. The point to be made in  
this improved plan is that, in the event of  
her going ashore, she is not liable to total  
damages, since, if the first bottom goes,  
she is still a whole ship. The *Conventina*  
was built by the Palmer Iron Shipbuilding  
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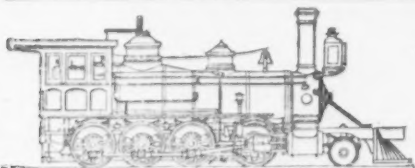
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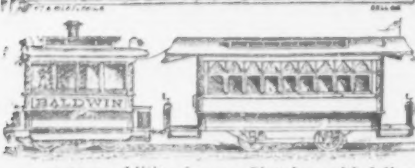
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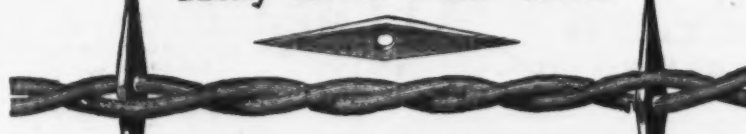
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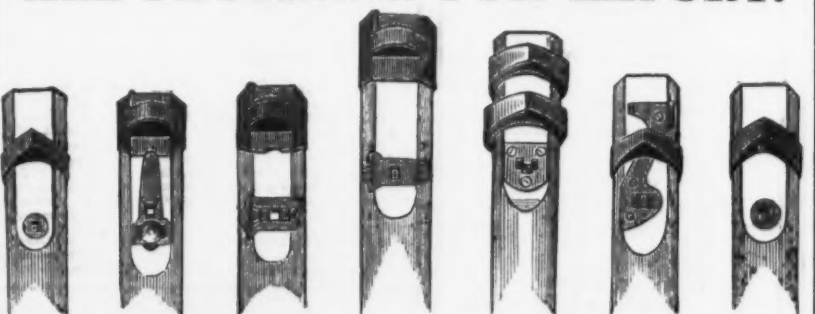
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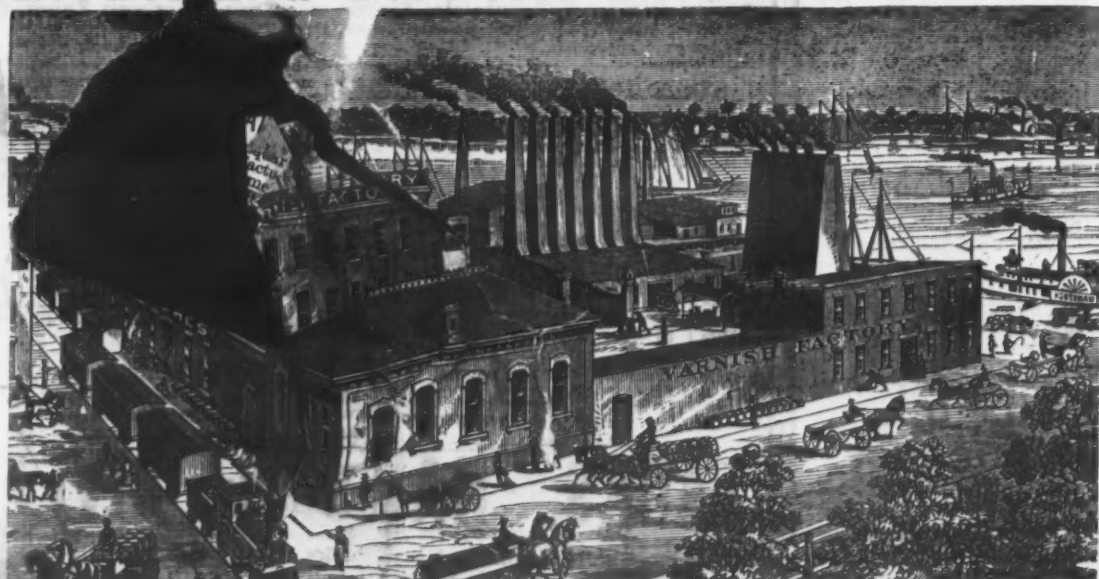
Have Removed to **ERIE, PA.**

This is the most successful Rat and Mouse  
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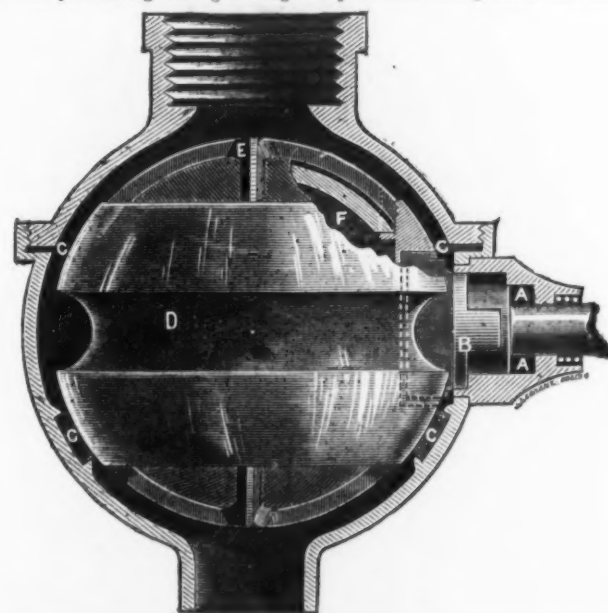
### Improved Reversible Filter.

The accompanying cut illustrates what is known to the trade as Crocker's Reversible Self-Packing and Self-Cleansing Filter, an entirely new article, having been patented within the present year, which is manufactured by the Crocker Filter Company, 174 High Street, Boston, Mass. It differs from all other reversible or revolving filters in several important particulars, among which may be mentioned the manner of packing the ball and outer case, indicated by C C in the engraving; the manner of holding the ball containing the filtering material; the self-packing stem or handle, indicated by A A in the engraving; the construction of the strainers E, and the manner of putting them into the ball. Among the reasons why this filter is superior to others, the manufacturers mention the following: The manner of packing at the bottom, in combination with the manner of holding the ball containing the filtering material, with a loose joint between the same and the reversing handle, makes it certain that there will be no leakage around the ball. The pressure of water seats the ball firmly in its position. The filter will always reverse as easily as when first put into use, which insures thorough cleansing at all times. The stem or handle for reversing the ball is so made and packed that the pressure of the water serves to make it tight, thus avoiding the annoyance of leakage at this point. The strainers screw into the ball, and are so made that the water is divided into four streams as it passes into the ball, thus securing thorough circulation and preventing boring through

a protectionist policy for that region, which will attract thither Northern capital and population, will be one of the first movements of this administration for breaking the "solid South," and disrupting for ever the Democratic party.

The South, while rapidly recovering from the effects of the war which devastated its country and revolutionized its labor system, can produce all the semi-tropical products of sugar, rice, tobacco, tea, and (in Florida) coffee, as well as wine and fruits which the vast region north of it can consume. Its freed men have to-day a competition in sugar, coffee, rice, and tobacco, &c., in foreign slave labor. Again, the needs of the war promoted the growth of manufacture of articles of prime necessity. Cotton mills have especially increased and proved profitable, till the whole country is dotted with small factories unknown before the war, and one of the results likely to follow this new-born industrial tendency is the manufacture into coarse yarns on the spot of the raw cotton which now so expensively finds its way to foreign spinning jennies.

You will thus perceive the elements of a strong party of protection in the South, and I think the time is not far distant when the South will be more protectionist than the North, where some manufacturers are already beginning to find that overprotection has but stimulated home competition, and that they have now to look to foreign markets for their surplus wares. Protection against foreign slave, as well as pauper, labor; protection to growing Southern industries and cultures, which shall attract capital and immigration and fill up a coun-



SECTIONAL VIEW THROUGH CROCKER'S IMPROVED REVERSIBLE FILTER.

the center. The wire netting is so secured to the framework as to be strengthened and protected thereby, and is removed with it by a wrench which accompanies the filter, thus rendering the matter of refilling very easy for even inexperienced persons. The filter in all particulars is thoroughly made, and the material with which it is filled is the best for the purpose. Material for refilling can always be obtained from the manufacturers.

Two sizes of the filter are made for ordinary housework, the cut showing in section the full size of the smaller one. Besides these sizes, which may be called faucet filters, the same principles and construction are applied to filters ranging from 8 to 30 inches in diameter, which are suited to all positions for which filters may be required, including the supply pipes of steam boilers. They are well adapted to use by paper manufacturers and bleachers, and in dye houses, laundries and other establishments where impurities in the water supply are objectionable. All the sizes are so constructed as to be cleansed without removing, the same as the faucet filters.

### Protection as a Future Political Issue.

If the English papers do not presently understand the position of this country with regard to free trade, it will not be because they have not had the facts laid clearly before them. For example, in a recent issue of the London Times, we find a letter written from Brussels by a correspondent who evidently understands the position of affairs in this country very thoroughly. Commenting on a recent editorial in that journal, the correspondent says:

While it is true, as you state, that the free-trade policy of the Democrats meets the strongest opposition in the States devoted to manufacturing interests, the agricultural community of the West are by no means opposed to protection, as is implied. The farmers of that region are growing in the conviction that protection to manufacturing interests secures them permanent home markets, home consumers, as against the uncertain markets of Europe, dependent on good or bad crops; that the constant, assured supply of New England (which does not raise wheat enough for starch for its mills) is as good, if not better, for their interests than the uncertain demand of Old England, with the granaries of Europe to compete with; and hence, to the surprise of political economists on this side the Atlantic, great Western States have favored the party of protection and will continue to do so; and what protection has done directly for agriculture may be instanced in one among other products—wine. California last year produced 30,000,000 gallons, and is to-day an exporter of its strong wine to Europe, where it serves to manufacture the "French" article. But it is to the South—which, as you say, is producing "only raw materials, has always been essentially a free-trade community—I wish to call attention. I think I may safely assert that the Southern States are rapidly becoming protectionists, that their interests are specially dependent upon protection, and that with the accession of General Garfield

try desolated by war and shall "make its waste places blossom like the rose," is to be a future party cry in the South, and you can readily understand what potent influences—humanitarian, political and industrial—will promote it. While the development of the South in the past decade has been rapid and most remarkable, it will, as before said, be stimulated by the coming Republican administration. The Times was the first to call public attention on this side to this growth and future, in an article (June, 1876) on a report of your then Chargé d'Affaires at Washington, Mr. Watson. "On the Trade and Some Resources of the United States for 1875," in which he laid special stress on the increasing prosperity and assured future of the South, as instanced by what was going on in Florida—an article widely reproduced and commented on sometimes with incredulity. The census just completed confirms fully the views there taken, and its results are a surprise to the Northern States; while, with a monopoly of some of the raw products necessary for the world's consumption, the South is becoming a competitor for some manufactures unknown there before the war, for which, as well as for some of its raw products, a large portion of its population will demand that protection which the Democratic platform of this Presidential canvass repudiates.

**The Fire in Keely Run Colliery.**—The Pottsville Miners' Journal says that the Schuylkill county Court of Common Pleas has made the following order in the case of the fire in the Keely Run Colliery: A. B. Cochran, Samuel Gray and John R. Hoffman are hereby appointed to make examinations and report, under oath, their conclusion and answers to the following questions: 1. Can Keely Run Colliery be flooded with water in the upper or first level, in such manner as to reach the fire now existing there, without danger to the lives of the persons employed in the colliery of Heckscher & Co., and without imminent peril or irreparable injury to the colliery of said Heckscher & Co.? 2. Has the first or upper level of the Keely Run Colliery already been flooded? If so, to what extent, and what has been the effect upon the colliery of Heckscher & Co.? The examiners are invited to accompany their report with such suggestions as they may deem pertinent and proper. The above-named parties, plaintiff and defendant, have permission to send their own engineers with the examiners hereby appointed, if they so desire. The examiners hereby appointed are requested to report to the court as soon as possible and in writing. The parties enjoined by the preliminary injunction heretofore granted, are hereby directed to discontinue the flooding of the Keely Run Colliery or the turning of any water into said mine for such purpose, until further order of the court, this being the object of the said injunction.

American cotton spinning is now, it appears, obtaining more appreciation in England. Mr. Kirkaldy, the well-known expert, has made some tests recently, and has found that a 3½-inch cotton belt broke under a load of 4187 pounds, while an English leather belt 4 inches wide was broken at 2000 pounds.



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MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.  
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89 Chambers and 71 Reade Streets, N. Y.

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PENNSYLVANIA FILE WORKS,

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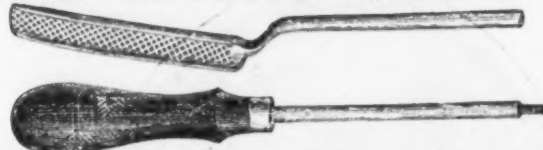
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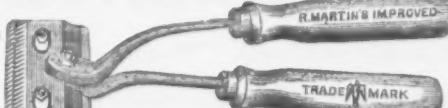
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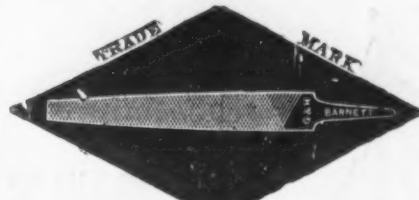
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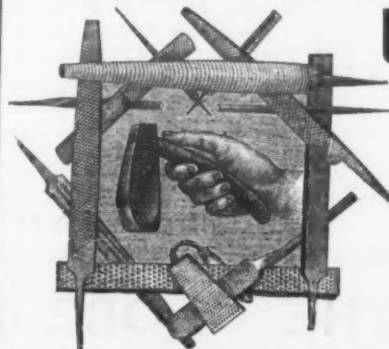
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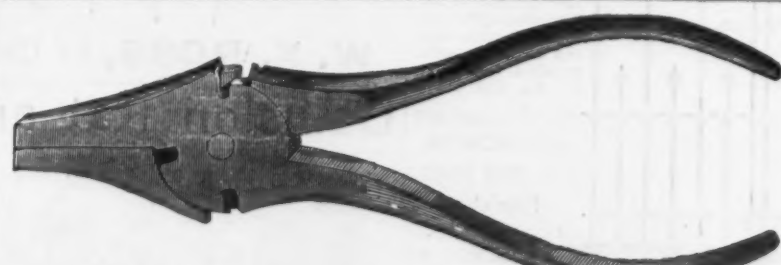
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### The Chemical Composition of Boiler Incrustations.

BY W. IVISON MACADAM.

For the last three years I have been engaged in an investigation as to the chemical composition of boiler incrustations, as also of the composition of the waters used for steam purposes, and of the materials employed as anti-incrustators.

The subject is one of much importance to steam users, and although, from time to time, various analyses and reports on the composition of boiler incrustations have been read before the learned societies, yet I am not aware that any attempt has, before this, been made to give a series of such an extent as to warrant the drawing of conclusions of any practical use and certainty.

When water is brought to the boiling point, either with or without other than atmospheric pressure, and maintained at that temperature, it tends more or less quickly to deposit the saline matters it contains in solution. These saline deposits are of two classes. The first series contain all those incrustations which are composed of substances insoluble in water, but soluble in an excess of carbonic acid gas. This class consists principally of carbonates, those of lime and magnesia being the most common. The second series contain much sulphate of lime, which is present in a soluble condition in the feed water.

**Carbonate Class.**—Waters commence depositing carbonates immediately on being heated, and continue doing so as long as there is any free carbonic acid gas contained in the water. The incrustations of this class are hard, firm cakes, which are difficult to remove from the boiler, and usually require to be chipped off with a hammer and chisel. The following analyses will show the chemical composition, the results being calculated to percentages:

| Source of water supply. | Total. | Carbonate of lime. | Sulphate of lime. | Carbonate of magnesia. | Silica. | Organic matters. | Moisture. |
|-------------------------|--------|--------------------|-------------------|------------------------|---------|------------------|-----------|
| Well.                   | 100.00 | 7.46               | 32.16             | 5.64                   | 80.04   | 3.31             | 6.79      |
| River.                  | 99.88  | 3.96               | 74.86             | 3.76                   | 1.15    | 8.66             | 3.10      |
| Spring.                 | 99.84  | 3.96               | 80.76             | 0.86                   | 10.84   | 3.76             | 1.23      |
| Well and River.         | 99.43  | 3.48               | 60.55             | 7.24                   | 10.16   | 3.96             | 1.23      |
| River.                  | 99.71  | 3.96               | 73.96             | 0.84                   | 8.84    | 4.44             | 1.53      |

From the above analyses it will be seen that the principal ingredient is carbonate of lime, while carbonate of magnesia and sulphate of lime are present in smaller proportions. The iron oxide is also small in amount, showing little corroding action on the boiler plates.

**Sulphate Class.**—The incrustations belonging to this series contain, as their characteristic element, sulphate of lime. The waters which contain this salt do not, when first heated, deposit, but as they become more and more concentrated by the volatilization of the steam, the water becomes unable to retain the saline matters in solution, and they are, therefore, gradually deposited. The series form tough, hard cakes, which are with difficulty removed from the boilers. The following analyses will show the composition calculated to percentages:

| Source of water supply. | Total. | Alumina. | Carbonate of lime. | Sulphate of lime. | Silica. | Organic matters. | Moisture. |
|-------------------------|--------|----------|--------------------|-------------------|---------|------------------|-----------|
| Pits and surface water. | 99.68  | 4.64     | 1.22               | 78.36             | 0.64    | 3.32             | 1.04      |
| Quarry.                 | 99.77  | 3.96     | 36.16              | 17.31             | 0.54    | 5.43             | 0.12      |
| Well.                   | 100.00 | 3.96     | 17.31              | 17.31             | 0.54    | 5.43             | 0.12      |
| Pits and surface water. | 99.86  | 3.96     | 17.31              | 17.31             | 0.54    | 5.43             | 0.12      |
| Well.                   | 100.00 | 3.96     | 17.31              | 17.31             | 0.54    | 5.43             | 0.12      |
| Burn.                   | 100.41 | 1.68     | 9.72               | 18.40             | 0.31    | 9.46             | 1.67      |
| Cartilage.              | 100.25 | 4.05     | 1.21               | 5.00              | 0.31    | 9.46             | 1.67      |

The above results show that the substance

which is present in greatest amount is the calcic sulphate, and that carbonate of lime, carbonate of magnesia, and iron oxide, are found in less proportions.

### WATERS.

The waters most usually employed in the steam boilers throughout the country are hard in quality. This probably arises from the fact that boilers are generally to be found in towns and populous places which have introduced a water supply from a distance. This supply is not, as a rule, so abundant as to admit of its being used for other than domestic purposes; and even where an unlimited supply is at hand, the cost is such as to debar its general adoption. Manufacturers are, therefore, compelled to go to other sources for their supplies, and recourse is had to wells. These wells are generally hard in nature, and are of two distinct classes, (1) those which contain carbonates, and are termed temporary hard waters, and (2) those having sulphates in solution, and forming what are called permanently hard waters. It is not uncommon to employ dirty or sewage waters, and also pit waters. The latter class of waters often contain much iron and alumina as acid sulphates, and are most injurious to boilers; for, besides forming hard incrustations, they act upon the iron of the boiler plates, gradually eating them through. Sewage waters are much esteemed by practical engineers, as they are said to scour or clean the boilers, a property which is due to the oily matters they hold in suspension, and the presence of which renders their use inadvisable. Much will also be effected by the organic substances in solution and suspension, which, mixing with the deposit as it is precipitated, do not permit of the formation of a hard scale. They give generally a soft mass or powder, which is readily removed from the boiler.

The following are the analyses of those various classes of water, the results being calculated in grains per imperial gallon:

| Grains in One Imperial Gallon. | District from which Sample was Obtained. |                     |                |                   |
|--------------------------------|--|---------------------|----------------|-------------------|
|                                | No. 10. Solihull.                        | No. 11. Gillingham. | No. 12. Frome. | No. 13. Carleton. |
| Total saline matter.           | 2.56                                     | 1.23                | 4.72           | 9.02              |
| Total organic matter.          | 0.68                                     | 0.35                | 1.16           | 4.46              |
| Total solid matter.            | 3.24                                     | 1.58                | 5.88           | 13.48             |
| Chlorine.                      | 0.50                                     | 0.25                | 0.25           | 0.75              |
| Carbonate of lime.             | 0.08                                     | 0.33                | 1.46           | 4.08              |
| Sulphate of lime.              | 0.23                                     | 0.22                | 0.43           | 0.36              |
| Source of supply.              | River Loch. River River                  |                     |                |                   |

These results show the water to be of good quality for steam purposes.

| Grains in One Imperial Gallon. | District from which Sample was Obtained. |                 |                     |                |
|--------------------------------|--|-----------------|---------------------|----------------|
|                                | No. 14. Epsom.                           | No. 15. Dunbar. | No. 16. Gillingham. | No. 17. Epsom. |
| Total saline matter.           | 15.68                                    | 6.00            | 58.24               | 25.60          |
| Total organic matter.          | 3.20                                     | 7.04            | 9.28                | 12.16          |
| Total solid matter.            | 18.88                                    | 13.04           | 67.52               | 37.76          |
| Chlorine.                      | 2.5                                      | 2.48            | 4.80                | 3.73           |
| Carbonate of lime.             | 1.03                                     | 1.03            | 1.44                | 1.44           |
| Sulphate of lime.              | 1.03                                     | 1.03            | 1.44                | 1.44           |
| Source of supply.              | Town supply, and well.                   |                 |                     |                |

| Grains in One Imperial Gallon. | District from which Sample was Obtained. |                     |                     |                     |
|--------------------------------|--|---------------------|---------------------|---------------------|
|                                | No. 18. Whitehill.                       | No. 19. Gillingham. | No. 20. Gillingham. | No. 21. Gillingham. |
| Total saline matter.           | 24.08                                    | 10.88               | 20.48               | 31.68               |
| Total organic matter.          | 3.88                                     | 6.08                | 3.20                | 4.38                |
| Total solid matter.            | 27.96                                    | 16.96               | 23.68               | 36.06               |
| Chlorine.                      | 1.5                                      | 2.75                | 2.0                 | 1.3                 |
| Carbonate of lime.             | 18.81                                    | 3.48                | 11.96               | 18.96               |
| Sulphate of lime.              | 4.37                                     | 4.06                | 6.54                | 12.21               |
| Source of supply.              | Pits.                                    |                     |                     |                     |

From these tables a good estimate of the comparative value of waters obtained from wells and from pits may be obtained. Both, it will be noted, vary widely according to

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TUCKER ALARM TILL CO., Indianapolis, Ind.  
Mounted: One end on Martin's Patent Caster—the other on rigid  
wheel. Runs straight in narrow aisle.  
ONLY ONE SIZE FOR  
ALL STOVES. Retail Price, \$2.75.  
IT IS A DAISY.  
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CAN REDUCE TO 12 IN. INCHES, BY CUTTING OFF SIDE BARS.  
Packed  
Six in a  
Case.  
Painted  
Black.

## THE SECURITY BLIND FAST CO.,

Manufacturers of  
PAT. BLIND FASTS, WROUGHT IRON BLIND HINGES, WINDOW SPRINGS  
Contracts for Hardware Specialties (wrought and malleable iron) executed promptly.  
Correspondence solicited with and estimates furnished to responsible parties.  
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## G. W. Bradley's Edge Tools.

Butchers' Cleavers,  
Butchers' Choppers,  
Axes and Hatchets,  
Grub Hoes and Mattocks,  
Mill Picks,  
Box Chisels and Scrapers,  
Ring Bush Hooks,  
Ax Eye Bush Hooks,  
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Watt's Ship Carpenters' Tools,  
Carpenters' Drawing Knives,  
Coopers' and Turpentine Tools.

MARTIN DOSCHER, Agent, 85 Chambers Street, N. Y.

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ALFRED H. HILDICK,  
12 Warren St., N. Y.,  
Importer of CHAINS, ANVILS, VISES, &c.  
Agency of  
HILL BROTHERS & CO., WALSALL, ENGLAND  
GENERAL HARDWARE MERCHANTS,  
And of  
BALL'S PAT. SOLID STEEL SHEEP SHEARS.  
These shears are unsurpassed for cheapness, dura-  
bility and utility. They are made of one solid piece  
of steel from point to point, and cannot be broken in  
use either in the bow or at the junction of the shank  
and blade. Samples can be seen at above address, or  
sample lots furnished.

## CORPORATE MARK,



Joseph Rodgers & Sons'  
(LIMITED)

CELEBRATED CUTLERY,  
No. 82 Chambers Street, New York.

F. & W. CLATWORTHY, Agents.  
The demand for Joseph Rodgers & Sons'  
productions having considerably increased, they  
have, in order to meet it, greatly extended their  
Manufacturing Premises and Steam power.  
To distinguish Articles of Joseph Rodgers  
& Sons' Manufacture, please to see that they bear  
their Corporate Mark.

P. O. Box 3962.

ESTABLISHED 1836.

Alfred Field & Co.,  
COMMISSION MERCHANTS,

New York, Birmingham, Sheffield, Liverpool.

## Guns and Pocket Cutlery,

## SPECIALTIES.

Headquarters for  
ELEY'S BROS. GOODS, WRIGHT'S ANVILS,  
WILSON'S BUTCHER KNIVES, &c.  
WORTENHOLM'S POCKET CUTLERY AND RAZORS,  
FIELD, FRASER & CONTINENTAL POCKET KNIVES,  
BUTCHER'S FILES, TOOLS AND RAZORS,  
JOSEPH ELLIOTT'S CELEBRATED RAZORS,  
WESTERN FILE CO.'S FILES,  
ENGLISH AND GERMAN GUNS,  
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GREAVES' SHEEP SHEARS,  
GERMAN COIL AND HALTERS and other CHAINS,  
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CANASTOTA KNIFE CO.'S POCKET KNIVES,  
Etc., Etc., Etc., Etc.  
All sorts of Hardware and Merchandise for im-  
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## Kangaroo Sheep Shears,

The best  
CORPORATE MARK  
Shears  
made.  
Every  
Shears  
Guaranteed.

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Send for price list and terms.

## J. STEVENS &amp; CO.,

Chicopee Falls, Mass., P. O. Box 224,  
Manufacturers of

SPRING CALIPERS & DIVIDERS.  
Also, surface Gauges and Counter Sinks,  
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Shot Guns, Pocket Rifles, Pocket Pistols,  
and the noted Hunters' Pet Rifles. Our  
Shooting Gallery Rifle is the favorite  
everywhere.

LIGHTNING  
STUMP PULLER,

R. S. DORSEY, Manufacturer,  
INDIANAPOLIS, . . . IND.



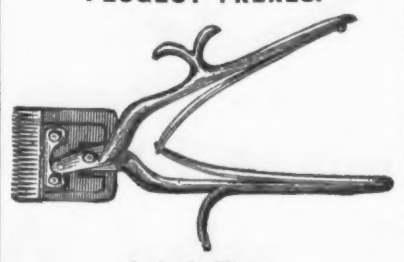
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## French Clippers

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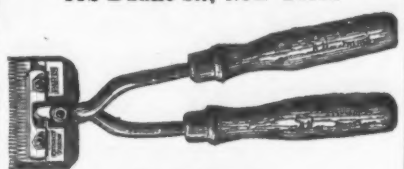


Barber's Clipper.

We are sole agents for these Clippers. All or-  
ders should be addressed to us to obtain lowest  
prices.

McCOY & SANDERS,

132 Duane St., New York.



Horse Clipper.

Silver Medal, 1878—Paris.



J. R. SPENCER & SON,

Albion Steel Works, Sheffield,

MANUFACTURERS OF

## FILES

AND

## STEEL,

Table Knives, Razors, Shovels, &c., &c.,  
of every description.

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Granted 1749.

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STEEL  
SHEARS,

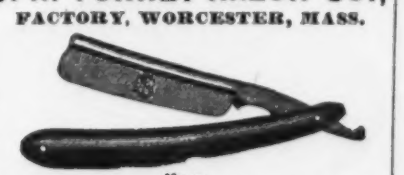
Manufactured by

The Gifford Manuf'g Co.,

UNION CITY, CONN.

## J. R. TORREY RAZOR CO.,

FACTORY, WORCESTER, MASS.



No. 10.  
For Fine Cutting Qualities, and Adapta-  
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## RAZORS

Have no equal.  
Price Lists on application.

## THE SLAYTON RAZOR.



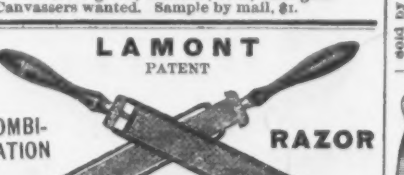
For Portability.  
For Cutting Quality.  
For Temper.

Handles of German Silver, Nickel Plated. Blades of the Fin-  
est Steel in the World. Every Razor Fully Warranted.

L. C. TOWER, Thermometer Manuf.,  
39 Exchange St., Rochester, N. Y., Sole Agent.  
Canvassers wanted. Sample by mail, \$1.

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PATENT



COMBI-  
NATION

STROP,

Manufactured by COPELAND, HALL & Co.,  
Rochester, N. Y.

Coulter, Flagler & Co., Sole New York City Agents.

## RIEHL BROTHERS,

50 S. 4th St., Philadelphia.

Improved Power & Hand

SAND SIFTER.

Every foundry should  
have one. Send for Prices.  
A liberal discount to  
dealers.

A. G. COES  
PAT. DEC. 26, 1871.

Established in 1839.

A. G. COES & CO.

WORCESTER,

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Successors to

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Manufacturers of

THE GENUINE

COES

Screw

Wrenches.

PATENTED,

May 2, 1871.

December 20, 1871.

December 28, 1875.

August 1, 1876.

The backstrain when the wrench is used is borne

by the bar—not by the handle.

The strongest Wrench made, and the only suc-  
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None genuine unless stamped

A. G. COES & CO.,

Our Agents, GRAHAM & HAINES, 113 Chambers St.,  
New York, carry a full line of our goods, and will be  
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STANDARD

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WARRANTED.

FOR

STRENGTH

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Durability

IT HAS

NO SUPERIOR.

GUARANTEED

IN

EVERY RESPECT.

Wrought Bar, Head

and Screw.

Owing to the in-  
creased demand  
for these justly

Popular Wrenches,  
we are now manu-  
facturing more than  
any other establish-  
ment in the world.

Our Wrench hav-  
ing been imitated by  
other manufactur-  
ers, we have adopt-  
ed the above Trade  
Mark, and will here-  
after stamp all our  
goods.

SEND FOR

TERMS and PRICES.

GIRARD WRENCH MFG. CO., Girard, Pa.

"DRAW CUT"

BUTCHERS' MACHINES.

Choppers, Hand and Power

Stuffers.

Lard Presses,

Warranted thoroughly made  
and the Best in Use.

MURRAY IRON WORKS,  
Burlington, Iowa.

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Manufacturers of

Measuring Tapes

Of Cotton, Linen & Steel.

FOR ALL PURPOSES.

351 to 353 Classon Ave., Brooklyn, N. Y.

CHAS. E. LITTLE,

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Solid Cast-Steel Pump Augers

For Boring Pump Logs and Pump

Tubing, with all necessary fittings. Agency for

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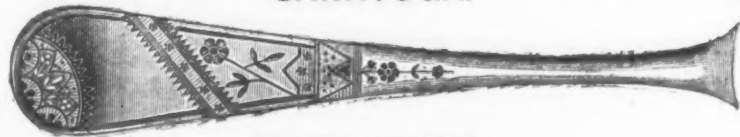


Patented Jan. 20, 1880.  
Same price as "OLIVE."

Post Office Address,

DRAWER 30,  
HARTFORD, CONN.

SARATOGA.



Same price as "OLIVE."

NEW YORK OFFICE, NO. 100 CHAMBERS STREET.

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Electro Plated Ware, German Silver and Britannia Spoons.



THE "NIAGARA."

Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.

## HOLMES, BOOTH & HAYDENS,

MANUFACTURERS OF

Finest Quality Silver-Plated Spoons, Forks, Knives, &c.

"JAPANESE"  
PATENTED.



"JAPANESE"  
PATENTED.

NOTICE.—We guarantee the base of our Spoons, Forks, &c., to be full 18 per cent. Nickel Silver, and extra heavily plated with pure Silver. Our goods are all hand burnished, and are first-class in every respect. We pack our Spoons and Forks one dozen in each box.

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Factories,  
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Manufacturers' Agent for

REVOLVERS, BREECH-LOADING GUNS,  
TABLE CUTLERY, BUTCHER KNIVES,  
CAST IRON & NICKEL PLATED STEEL SHEARS.

Representing THE LEE ARMS CO.,  
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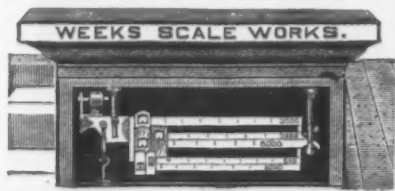
THE GREENFIELD CO-OP. WORKS,  
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THE BALTIMORE SHEAR CO.

## AMERICAN BOLT CO., Lowell, Mass.,

MANUFACTURERS OF

Bolts, Nuts, Washers, Chain Links, Car  
Bolts, Bridge Bolts, Lag Screws, &c.

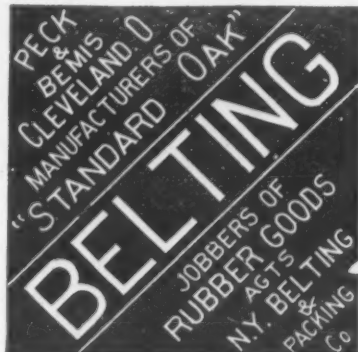


562 Washington St., Buffalo, N. Y.  
5 ton with Single Draw Beam.....\$60.00  
5 " " Combination Beam.....70.00  
Larger sizes proportionately low in price; and  
every Scale warranted Accurate and Durable.  
Agents wanted.

WEEKS & RAY, Proprietors.

GEORGE W. BRUCE, 1 Platt St., New York,  
Proprietor of the  
ATLANTIC SCREW WORKS,  
and Agent for the  
FLORENCE TACK CO.

Wood Screws, Tacks, Nails, &c.,  
of every description, of the best quality,  
at the lowest rates.



GEO. H. CREED,  
SHIP CHANDLERY,  
103 Reade Street, New York,  
Manufacturers of and Wholesale Dealers in  
Cotton and "Long Flax" Sail Duck,  
Cotton and Linen Havens,  
Creed's Patent Ships' Clews, 'Hettman's Wire Rope  
Splicers, Agent for Raymond's American Crane Oil  
for lubricating Cylinders and Valves.

## A. F. PIKE, Pike Station, - - New Hampshire, Manufacturer and Wholesale Dealer in

Bluestone

For Scythes, Axes, Knives and Turpentine Hacks.

Factories at Pike Station, N. H.,  
and Evansville & Westmore, Vt.

Genuine Old Reliable,  
Indiana Pond (Red Ends),  
Premium Union,  
White Mountain,  
Lafayette, Hocking,  
Diamond Grit,  
The New Boss,  
Linnell, Rags,  
Willoughby Lake,  
Green Mountain,  
Black Diamonds,  
Moving Machine,  
German Patterns,  
Chocolate, Ax Bits.

Stones made, labeled and branded in any style de-  
sired. PRICE and QUALITY GUARANTEED. All the above  
brands are of clear, keen grit and will not glaze.

"VALENTINE'S" PATENT  
FELT WEATHER STRIP.

For keeping out Cold, Wind and Dust. The best  
most durable and cheapest strip in the market. It is  
not affected by the weather, does not become hard  
and brittle in cold or melt in warm weather. Sam-  
ples and Price Lists sent free by mail.

W. T. VALENTINE,  
Sole Manu'f'r and Patentee, Albany, N. Y.

the locality from which they have been ob-  
tained.

STEAM BOILER WATERS.—SEWAGE IMPREGNATED.

District from which  
Sample was Obtained.

Grains in One Imperial  
Gallon.

No. 25,  
Portobello.

No. 26,  
Edinburgh.

No. 27,  
Kinghorn.

Total saline matter.....15.36 26.56 15.68

Total organic matter.....6.40 6.72 6.40

Total solid matter.....21.76 33.28 22.08

Chlorine.....3.7 7.0 5.8

Carbonate of lime.....6.16 5.61 12.21

Sulphate of lime.....16.00 16.33 9.34

Source of supply.....Burn. Burn. Lech.

ANTI INCURSTATIONS.

All waters, whether hard or soft, when

employed for steam purposes, give a deposit

or incrustation, which falls to the bottom

and adheres firmly to the boiler plates.

These incrustations cause a very great loss of

heat, amounting, in some cases, to nearly 30

per cent. of the fuel used, and when allowed

to remain, soon make the plates of the boiler

twisted and broken, besides very often being

the cause of disastrous explosions and great

loss of life and property. Many substances

are used to prevent the incrusting of the

plates of boilers, some of which profess to

mechanically. As to the first of these

classes, a material which can act on the

hard, firm incrustation, and render it sol-  
uble, will most likely also eat into the boiler,  
and thus cause more damage than good,  
and, even if successful, would lead to prim-  
ing. The second series, however, play an  
important part. Their object is to compel  
the sediment of water to be given off in such  
a state that it shall not adhere to the bottom  
or sides of the boiler or tubes. This is a very  
large class, and contains many members  
widely differing from each other in chemical  
composition and characters. For conven-  
ience of consideration, they can be divided  
into (1) saline, (2) fatty, (3) organic and  
gelatinous, and (4) paraffine and paraffine  
products.

Saline Compositions.—The more common-

ly met with saline materials used as anti-

incrustators are washing soda and soda ash.

When these bodies are added to a water, the

lime salts present in it are precipitated at

once as carbonates, and form a dense white

flocculent mass. The water, on boiling for

some time, deposits a hard cake of incrusta-  
tion which it is difficult to remove. The com-  
positions consisting of carbonate of soda are  
many in number, and have special names  
according to the fancy of the vender. One  
sample analyzed was colored with blue  
litmus. The following analyses are from  
incrustations where carbonate of soda is em-  
ployed:

BOILER INCURSTATIONS.—CARBONATE OF SODA EM-  
PLOYED.

District from which  
Sample was Obtained.

No. 28,  
Glasgow.

No. 29,  
Edinburgh.

No. 30,  
Edinburgh.

Oxide of iron.....1.06 9.84 3.44

Alumina.....34.67 61.64 6.52

Carbonate of lime.....23.84 5.12 16.88

Carbonate of magnesia.....25.88 1.44 48.20

Sulphate of lime.....6.41 4.45 10.02

Sulphate of soda.....5.54 10.34 5.36

Silica.....0.25 1.59 0.38

Organic matters.....1.34 2.53 3.05

Moisture.....99.82 99.65 99.80

Source of water supply.....Well. Water supply. Well.

These results show a large amount of

sulphate of soda, which has been formed by

the carbonate of soda and the sulphates of

the water interchanging acids, and becom-  
ing sulphate of soda and carbonate of lime.

Fatty Compositions.—In this series are in-  
cluded tallow and the fatty oils. The em-  
ployment of tallow, although common, is at-  
tended with much danger, as is proved by  
the number of boiler explosions from this  
cause, the boilers showing, when examined,  
that quantities of the tallow have combined  
with the lime salts to form an insoluble  
lime soap, which adheres to the plates of  
the bottom and sides of the boilers, allow-  
ing the iron to be overheated, and causing  
the plate to be burned and twisted. Besides  
this, fatty acids are evolved, which attack  
the iron plates and gradually eat them  
through. This is readily observed from the  
analyses of incrustations of this class, which  
show a considerable proportion of iron:

BOILER INCURSTATIONS.—TALLOW EMPLOYED.

District from which Sam-  
ples were obtained.

No. 35,  
Glasgow.

No. 36,  
Fountainhall.

Oxide of iron.....11.60 25.72

Alumina.....5.92 44.83

Carbonate of lime.....6.70 6.44

Carbonate of magnesia.....1.52 3.12

Sulphate of lime.....12.16 13.33

Sodium salts, &c.....58.50 3.80

Organic matters.....3.64 2.24

Moisture.....100.10 99.92

Source of water supply.....Loch. River.

Oily matters.....57.47 3.20

The employment of waste or condensed

steam often leads to the introduction of

tallow into boilers. The following analysis

of a sediment from a condensed steam tank,

shows the action of the tallow on brass or

copper and iron, as well as the amount of

oily matters carried over by steam:

SEDIMENT FROM CONDENSED STEAM TANK.

(District from which Sample was taken—No. 37,  
Sheffield.)

Oxide of iron.....50.21

Alumina.....1.07

Carbonate of lime.....0.38

Carbonate of magnesia.....1.28

Sulphate of lime.....1.43

Oxide of copper.....0.88

Salts of sodium.....0.11

Silica.....1.38

Organic matters.....41.93

Moisture.....0.87

Total.....100.47

Source of water supply.....Well. Well. Well.

Oily matter.....41.36

Organic and Gelatinous Compositions.—

Some waste materials from manufactories

are employed as anti-incrustators. Peat or

moss is used in some works where it can

readily be obtained, and is of considerable

service. It evidently acts, as do all the

members of this class, by keeping the de-  
posit from the water in continual motion,  
and the particles mixing with the solid re-  
tard the formation of a firm deposit. They  
yield a soft mass or powder readily removed  
from the boiler. The following analyses  
show the composition of deposits from boilers  
using this class of anti-incrustators:

BOILER INCURSTATIONS.—ORGANIC OR GELATINOUS  
COMPOSITIONS EMPLOYED.

District from which Sample was Obtained.

No. 38,  
Birmingham.

No. 39,  
Birmingham.

No. 40,  
Carberry.

No. 41,  
Allou.

No. 42,  
Newbattle.

No. 43,  
Whitehill.

No. 44,  
Whitehill.

No. 45,  
Whitehill.

No. 46,  
Gorton.

Oxide of iron.....2.20 2.60 3.64

Alumina.....89.28 10.28 16.54

Carbonate of lime.....6.11 7.46 25.84

Carbonate of magnesia.....53.51 71.35 88.08

Sulphate of lime.....2.20 2.20 2.20

Sodium salts, &c.....3.37 4.14 14.04

Silica.....3.37 4.14 14.04

Organic matters.....3.37 4.14 14.04

Moisture.....3.37 4.14 14.04

Total.....99.64 100.00 100.00

Source of water supply.....Well. Well. Well.

It will be observed that these analyses

agree very nearly with those obtained from

boilers using no anti-incrustator. The

organic matter is in some of the analyses

higher, but the greatest difference is, that

while the one is a hard scale very difficult to

remove, the other is a soft mass readily

cleaned away.

There is a class of anti-incrustators em-  
ployed which contain a gelatinous body with  
a saline substance (generally washing soda).  
Such materials throw down the lime salts,  
and by their mechanical action tend to yield  
an incrustation not nearly so hard as the  
plain salts do. The following table shows  
the results of the analyses of incrustations  
from boilers employing this large class of  
mixtures:

BOILER INCURSTATIONS.—MIXED GELATINOUS AND  
SALINE COMPOSITIONS EMPLOYED.

District from which Sample was Obtained.

No. 47,  
Craigleith.

No. 48,  
Linthgow.

No. 49,  
Leith.

No. 50,  
Leith.

No. 51,  
Edinburgh.

No. 52,  
Portobello.

No. 53,  
Edinburgh.

No. 54,  
Edinburgh.

No. 55,  
Kinghorn.

No. 56,  
Edinburgh.

No. 57,  
Portobello.

No. 58,  
Leith.

Oxide of iron.....5.36 8.12 4.16

Alumina.....71.67 8.68 15.17

Carbonate of lime.....12.08 15.40 11.08

Carbonate of magnesia.....6.61 9.24 12.46

Sulphate of lime.....0.60 0.60 0.60

Sodium salts, &c.....1.24 1.24 1.24

Silica.....8.86 0.86 0.86

Organic matters.....0.97 0.97 0.97

Moisture.....99.80 99.80 99.80

Source of water supply.....Well. Well. Well.

Paraffine and Paraffine Products.—The last

class of anti-incrustators are paraffine and

paraffine products. Paraffine itself is em-  
ployed in considerable quantity and gives

good results. It acts entirely by coating the

particles of sediment, forming them into

minute balls or pellets, which do not adhere

to each other, and these being constantly

kept in motion, yield a light granular sed-  
iment readily removed from the boiler. The  
amount used is about one pint per week.

The results of the analyses of sediments from  
such boilers are as below:

BOILER INCURSTATIONS.—PARAFFINE OIL EMPLOYED.

District from which sam-  
ple was obtained.

No. 59,  
Glasgow.

No. 60,  
Glasgow.

No. 61,  
Dunfermline.

Oxide of iron.....5.48 2.12 27.58

Alumina.....34.03 51.16 1.21

Carbonate of lime.....20.16 20.03 3.08

Carbonate of magnesia.....4.54 15.52 60.88

Sulphate of lime.....0.56 0.56 0.



# H. D. SMITH & CO.,

## Plantville, Conn.,

Manufacturers of the

## BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

## SARANAC HORSE NAIL CO.

### Polished or Blued Horse Nails, Hammered and Finished.

The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

S. P. BOWEN, President and Treasurer.

PLATTSBURG, N. Y.

J. W. LYNDE, Secretary.

ELY & WILLIAMS, Gen'l Agents for Eastern and Middle States, 1232 Market St., Philadelphia; 178½ Water St., New York; 36 Oliver Street, Boston. S. H. & E. Y MOORE, Gen'l Agents for Western States, 163 and 165 Lake Street, Chicago, Ill. SAM'L G. B. COOK & CO., Agents for Southern States, Nos. 67 and 69 (old Nos. 5 and 7) German Street, Baltimore, Md.

**SARANAC HORSE NAILS,**  
Blued or Polished.  
Terms, Cash, within 60 Days.  
Nos. 5 6 7 8 9 10  
Cts. 26 23 21 20 19 18

AGENTS FOR

W. & C. Scott & Son's,

J. P. Clabrough & Bros.'

C. G. Bonehill's

BREECH LOADING GUNS.



COLT'S

PARKER'S and

REMINGTON'S

BREECH LOADING GUNS.

## HARTLEY & GRAHAM,

Post Office Box 1760.

NEW YORK.

17 and 19 Maiden Lane.

Importers and Jobbers,  
AMERICAN BREECH LOADING  
ENGLISH " "  
BELGIAN " "

## GUNS

CHEAPEST AND BEST GRADES.  
ENGLISH MUZZLE LOADING  
BELGIAN " "  
FLOBERT RIFLES, Plain and Remington System.

BRITISH BULL DOG REVOLVERS, 38, 44 and 45 Calibre.

Agents for COLT'S and ROBIN HOOD line of REVOLVERS, BRIDGEPORT GUN IMPLEMENT CO.'S GOODS, UNION METALLIC CARTRIDGE CO.

## Union Manufacturing Company,

Sole Manufacturers of

SKINNER'S PATENT COMBINATION CHUCK.

Universal, Independent and Eccentric.

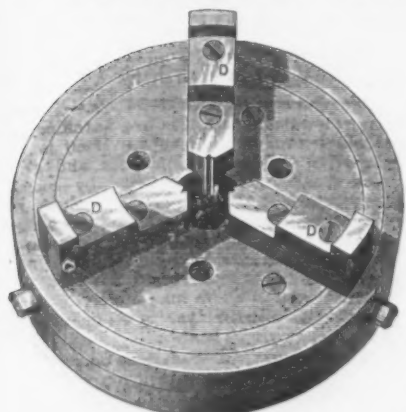


Fig. 1.-Front View.

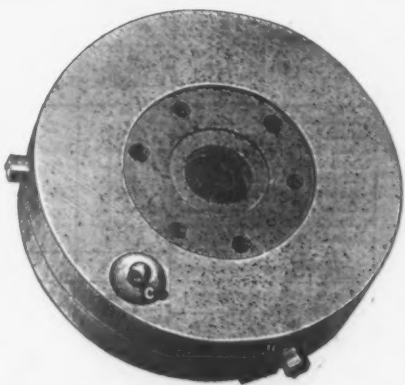


Fig. 2.-Back View.

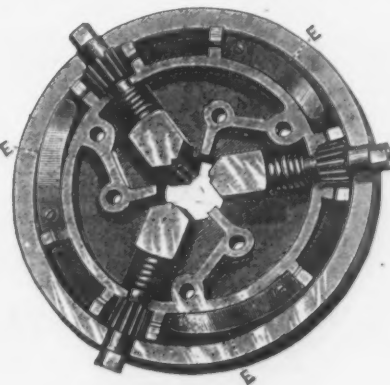


Fig. 3.-Front Plate.



Fig. 4.-Back Plate.

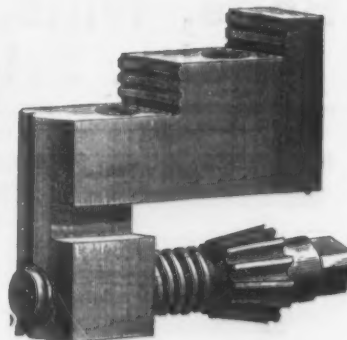


Fig. 7.-Patent Jaw.

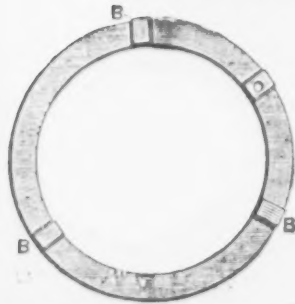


Fig. 5.-Cam Ring.

This Chuck is Universal, Independent and Eccentric, and was patented June 24 and November 18, 1879.

We are determined that this Chuck shall be the best in the market. Believing that our customers do not want an inferior article, and with the improvements, as shown in the cuts, we have no hesitation in saying **Ours is the Best Chuck Manufactured**, and we **Guarantee Every Chuck of this make perfect in every respect.**

All parts will be made interchangeable, and in case repairs become necessary, we can furnish the part needed without the chuck being returned to us, saving much time and expense, especially on **Goods sold out of the country.**

By sliding the Stud C (Fig. 2) the Chuck can instantly be changed from Universal to Independent, and vice versa.

Whenever, by use or from any cause, the faces of the jaws are found out of true, the several faces in the different jaws, which should be in the same plane, can be readily adjusted by screwing out the screws D D D (Fig. 1) until the projecting heads are in the same plane, at right angles to the axis.

Please send for full descriptive circular and prices.

**UNION MFG. CO., New Britain, Conn.**

Warehouse, 96 Chambers Street, New York.



Fig. 6.-Circular Back.



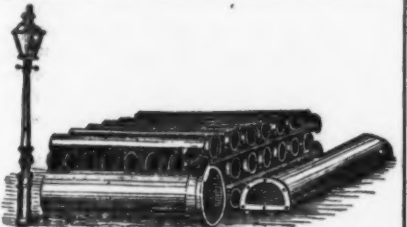


## SPENCER & UNDERHILL,

94 Chambers St., New York, Agents for American Screw Co.'s Wood Machine and Rail Screws, Stove and Tire Bolts, Rivets, &c. G. F. Warner & Co.'s Carriage Clamps.

### DEPOT FOR

O. Ames & Son's Shovels, Spades and Scoops. A. Field & Son's Tacks, Brads, Nails, &c. Nicholson File Co.'s Files and Rasps. W. & S. Butler's Chisels, Gouges, Plane Irons and Cleavers. E. W. Gilmore & Co.'s Strap and T Hinges. Russell Jennings' Auger and Dowel Bits. Also a general assortment of Hardware.



## R. D. WOOD & CO.

Philadelphia, Manufacturers of

## Cast Iron Pipe

FOR WATER AND GAS.

Lamp Posts, Valves, &c., Mathew's Pat. Anti-Freezing Hydrants. 400 CHESTNUT STREET.

## N. Y. Mallet and HANDLE WORKS



Manufacturers of Calkers', Carpenters', Stone Cutters' Tin, Copper and Boiler Makers'.

### MALLETS,

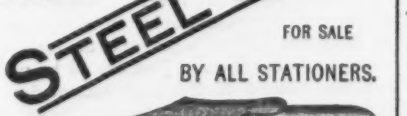
Hawing Beets, Hawing and Calking Irons; also all kinds of Handles, Sledge, Chisel and Hammer Handles. Also

COTTON AND RALE HOOKS. Patented Feb. 13, 1877; a new combination of Hooks. 456 E. Houston St., New York City.

## ESTERBROOK'S

STANDARD

and RELIABLE



FOR SALE

BY ALL STATIONERS.

ESTERBROOK STEEL PEN CO. Works, Camden, N. J. 26 John St., New York.

## THE ULSTER SLED



Patented March 13, 1877.

Trade Mark registered October 23, 1876.

Runners and Cross Bars of One Piece of Metal, Making the

Strongest, Prettiest and Most Perfect Sled ever made.

Sold by all dealers.

CROSBY, SAHLER & CO., Rondout, N. Y., Manufacturers.

W. H. QUINN & CO., 79 Chambers St., New York Agents.

## BUFFALO SCALE CO.,

BUFFALO, N. Y.,

Manufacturers of

R. H. Track Scales, Hay Scales, Coal Scales, Grain Scales, Platform Scales, Counter Scales, &c. Send for price list, stating what you want.

## Vulcanized Rubber Fabrics

ADAPTED TO MECHANICAL PURPOSES.

### RUBBER BELTING and PACKING.

Machine Belting, Steam Packing, Leading Hose, Suction Hose, Grain Elevator Belting, Steam Hose, Piston-Rod Packing, Gaskets and Rings.



Vacuum Pump Valves, Ball Valves, Car Springs, Wagon Springs, Gas Tubing, Machine Belting, Wringer Rolls, Billiard Cushions, Grain Drill Tubes, Emery Wheels.

This company manufactures the immense DRIVING and ELEVATOR BELTS for the Buckingham Elevators at Chicago, which have been running perfectly for more than Twelve Years, also those for Armour, Dole & Co., Chicago, and Vanderbilt's great elevators of the New York Central and Hudson R. R., New York, being the Largest Belts in the World. We are now making an Elevator Belt, 36 inches wide and 200 feet in length, which will weigh over 18,000 pounds.

### LINEN and COTTON HOSE,



Pat. 6545. Plain and Rubber Lined.

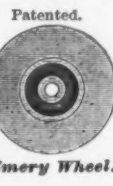
Circular Woven-Seamless Antiseptic RUBBER LINED "CABLE" HOSE and "TEST" HOSE, Vulcanized Para Rubber and Carbolized Duck, for the use of Steam and Hand Fire Engines, Force Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c.



"TEST" HOSE.

"CABLE" ANTISEPTIC

## Emery Wheels and Packing.



Patented.

ORIGINAL

### Solid Vulcanite EMERY WHEELS



Section of Emery Wheel showing Iron Center.

LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED.

The properties of these Wheels are such that they can be used with great advantage and economy for cutting, grinding, and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, Slate, Marble, Glass, etc. These Wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools, Plows, Safes, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agricultural Implements, and small Machinery of almost every description.

### PATENT ELASTIC

### Rubber Back Square Packing

BEST IN THE WORLD.

For Packing the Piston Rods & Valve Stems of Steam Engines & Pumps.

B represents that part of the packing which, when in use, is in contact with the Piston rod. A the elastic back, which keeps the part B against the rod with sufficient pressure to be steam tight, and yet creates but little friction.

This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square.

### Corrugated Rubber Mats and Matting,



For Halls, Flooring, Stone and Iron Stairways, &c.



This practical and indispensable article—especially for wear where exposed to ice, snow, or slush—was first introduced by this company several years ago, and its real value is in being almost indestructible, when proper materials are used in its manufacture, whilst the cheap, inferior quality forced on the public by reckless imitators of our patent goods soon becomes brittle and crumbles to pieces. Address

NEW YORK BELTING & PACKING CO., Warehouse, 37 and 38 Park Row, New York. JOHN H. CHEEVER, Treasurer.

## CHALFANT MFG. CO.,

Office and Warehouse,

435 Arch St., Philadelphia.

Owners and Manufacturers of the

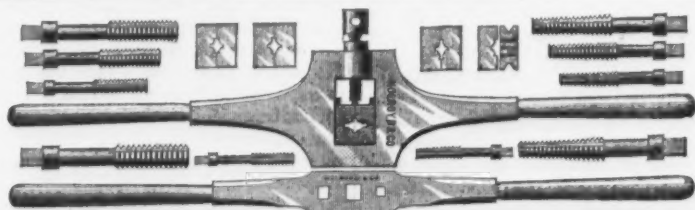
### Celebrated Patent Gas Heating Smoothing Iron.



Can be heated on any ordinary gas burner in three minutes. People who have to board cannot get along without them. Also manufacturers of the

### Improved Troy Polishing Iron.

for laundry purposes. For sale by Hardware and Housefurnishing dealers. Liberal discount to the trade.



## HOLROYD & CO., Waterford, N. Y.,

Manufacturers of

### STOCKS AND DIES,

For Blacksmiths, Machinists and Gas Fitters.

Send for Circular.



## WHITE ANCHOR FIRE HOSE,

FOR FIRE PROTECTION IN

### Manufacturing Establishments.

This Hose is in use in over 300 Fire Departments; weighs but 58 pounds to the section of 50 feet; will stand a pressure of 400 pounds to the square inch; guaranteed for three years; will retain its strength for many years. We have many testimonials showing continuous service for nine years, where the hose is in good condition for fire service. For sample and price, address

### AKRON RUBBER WORKS, Akron, Ohio.

produced along with the paraffine oil, and it is due to this that the iron oxide is so large in quantity. Paraffine oil, when introduced into a dirty boiler, soaks into the incrustation, and gradually causes the hard sediment to crack and split up, when it is easily removed. On account of its mode of action being to prevent the incrustation thickening, it is found better to coat the inside of the boiler when empty with the paraffine. The employment of condensed water should be dispensed with on account of the large amount of fatty oils it contains. The use of paraffine oil is unattended with the constant priming which is found to take place when tallow is employed, and the amount of oil introduced can be increased without running any risk or delay from this cause. Paraffine mixed with fatty oils composes several well-known compositions. The substance does not mix well, and floats on the surface of the water in the boiler.

The soda liquor obtained as a waste substance during the purification of paraffine oil is largely employed, and furnishes some of the more commonly used compositions. The incrustation from boilers using this soda liquor gives the results, on analyses, stated in the following table:

|                        | District from which sample was obtained. |                    |
|------------------------|--|--------------------|
|                        | No. 62. Leith.                           | No. 63. Edinburgh. |
| Oxide of iron.....     | 3.52                                     | 2.12               |
| Alumina.....           | 1.04                                     | 84.86              |
| Carbonate of lime..... | 7.96                                     | 1.76               |
| Sulphate of lime.....  | 60.12                                    | 3.53               |
| Sodium salts, &c.....  | 1.41                                     | 1.37               |
| Silica.....            | 15.53                                    | 3.02               |
| Organic matters.....   | 4.39                                     | 1.26               |
| Moisture.....          | 5.82                                     | 1.95               |
| Total.....             | 99.79                                    | 99.97              |

Source of water supply....

SEWAGE AND SURFACE. TOWN SUPPLY ONLY. WATER WELL.

Zinc has lately been used to a considerable extent, and seems to work well in marine boilers. The action is said to be galvanic. It has been tried several times in land boilers, but, so far as I can learn, has never been successful, and, in fact, the incrustation is deposited as fast as when no anti-incrustator is employed. These experiments go far to prove that the action is not caused by galvanism, but to some definite chemical action probably due to the chlorides of the sea water.

Looking to the fact that most steam raising water is hard, and considering the loss of time and money consequent on the laying up of the boilers for cleaning, it comes to be an important point as to whether it would not be advisable to soften the water before use. This is easily accomplished; for provided the water be "temporary" hard (that is, contains carbonate of lime), the use of Clark's process will soften it. The process consists in adding lime to the water, which combines with the free carbonic acid gas, forming insoluble carbonate of lime, which falls to the bottom of the vessel, accompanied by all the carbonate of lime previously held in solution by the free carbonic acid gas. When the water contains sulphate of lime, and is "permanently" hard, the addition of a small quantity of washing soda will remove the greater part of the lime salts, and render the water soft. The softening process should be employed before the water reaches the boiler, and will be greatly aided by heat from the waste steam, care being taken that a paraffine lubricant is employed for the cylinders. The softening of water has not been much practiced, but much can be done in this way to improve boiler feed waters.

### Hints to Hardware Exporters.

The United States Consul for Wurtemberg says that there has been a large increase in the demand for American builders' hardware, metal trimmings for furniture, tools for woodworking, &c. Articles embraced under this head have been but recently introduced here, by way of an experiment, which is likely to lead to a considerable trade, provided the American manufacturer will consult the wishes of the builders and dealers on the Continent as to style and pattern of goods. The senior member of a large importing house writes to this consulate as follows:

"The tools are of most excellent quality and practical construction, and will, if this standard is not lowered, always hold their ground in Germany and meet with increased favor."

The reason why they are not now sold in greater quantities is that in the greatest number of workshops the employers still furnish their workmen with tools, and do not buy those of finest and best quality, because the workmen do not take as good care of them as if they were their own property. Some of the less important employers, who work with their employees, and the better class of workmen, purchase the American tools, but there is at present a want of paying employment, and the trade is therefore dull.

The builders' hardware from America is most perfect in its workmanship and finish, but is in most cases unsuitable to the German demand, because the manner of building and the construction of furniture here differs from the American method.

There is a great deal of fine hardware used in building, but the American articles in this branch display a want of style in the designs, i. e., they do not appear to be intended for any particular order of architecture. This fact greatly hinders their sale on the Continent.

The present prevailing style of architecture in Germany is the German Renaissance. Models and drawings in this genre could be readily obtained from our architects, but, as far as we know, no American manufacturer has as yet made an effort to fulfill our requirements. Perhaps this may be accounted for by the fact that the American manufacturer rarely deals directly with the German merchants and consumers, but nearly always through the mediation of the importers, who

care little for the specialties of the market, but only seek to dispose of large quantities of goods.

The new imperial tariff, of course, increases the cost of iron goods, but the chief addition to the cost of American goods consists in the very high charges for handling, shipping and transportation, which in many instances exceed the invoice cost of goods. This might be corrected with great advantage to the American exporter.

The English manufacturer delivers his wares generally on board, while in America high charges are reckoned for shipment. The charges for packing are also much greater than the real cost, except in case of original packages.

Regarding to transportation, the route via Antwerp and Rotterdam (Rhine to Mannheim) would be much more advantageous for Southern Germany than via Bremen or Hamburg. The minimum rates of those lines, however, are yet too high for small consignments.

Cutlery, carpenters' tools, hay and dung forks, wrenches, hat and coat hooks, furniture casters, bracket supports, consoles, knife sharpeners, locks and other light hardware of American manufacture have been fairly introduced here, and, after tests, have proved to be so much superior to similar articles of German manufacture that the demand is likely to become large and permanent. One of the leading importers of such articles writes to this consulate as follows:

"Different kinds of American cheap locks have been introduced here, but these will not meet with a large sale until they are made to conform more nearly to our patterns."

"The cutlery of the United States is of high merit and worthy of the price asked, but latterly efforts are being made in Germany to produce wares of as good quality for the same price."

"American tools, light hardware and agricultural implements sold by us are much superior in quality and form to the German manufacture, and for this reason the importation of such articles will not be seriously affected by the new tariff."

### The Latest Rapid Transit Scheme.

Jules Verne has been hitherto credited with possessing the most fertile brain in devising extraordinary means of travel, but the following scheme, put forth in the New York World by a genius signing himself "A Common sense Engineer," will show that he has now met with a formidable rival.

It is possible, says the "Common-sense Engineer," to transport freight and passengers from New York to San Francisco in 10 hours, providing only capital enough be furnished to construct the road properly. With certain modifications, the plan which I here submit to the public judgment could be made to work even with our ordinary steam motors, though it would work more easily and less expensively by aid of the power of Niagara Falls, transmitted according to the well-known scheme. If there were anything whatever in the Keeley motor, that would be precisely the power I want. The plan proposed is as follows: A fair rate of speed for a railway train is 40 miles an hour. The distance from New York to San Francisco is, roughly, 3000 miles. I would divide this distance into 30 parts, with stations at every 100 miles. First a track, not differing greatly from the ordinary railroad track, should be laid for 100 miles, and it is only necessary to study rapid transit according to my plan over this section of the road to understand how the whole system would work. Over the first track of 100 miles, and running over cannon balls upon that track, is another, say 90 miles long, on which in turn is another 80 miles long, and so on till on the whole system the freight and passenger train runs, it being of any desired and practicable length. Suppose it is required to go from A to B, a distance of 100 miles, the stable track over which all the others run is, of course, 100 miles long, and the first movable track upon it is 90 miles long. Let the first be drawn by a stationary engine the remaining 10 miles, whereby one of its extremities will reach B, and let us say that it takes 15 minutes for it to move through the 10 miles. In the meantime the track 80 miles long, which runs on the track 90 miles long, will have been advanced 10 miles by the motion of the 90 mile track, and will itself (either by means of a stationary engine or a locomotive) have advanced 10 miles on its own track, so that in all it will have gone 20 miles in the 15 minutes, and its extremity will reach B at the same time B is reached by the 90-mile track. So with the 70, the 60, the 50 tracks, and up to the passenger and freight trains, which will reach B as soon as the 90-mile track reaches B—that is to say, in 15 minutes, at the end of which it will have traveled about 100 miles. Perhaps the following statement will make the matter clearer: Let us call the 90-mile track A, the 80-mile track B, and so on. A is drawn 10 miles, carrying with it B for the same distance. But B has a motion of its own and travels over 10 miles on its own account. It has therefore gone 20 miles. C, with a 10-mile motion of its own over B, which draws it along, has gone 30 miles; D, 40; E, 50; F, 60; G, 70; H, 80; I, 90; J (which is the passenger and freight train), 100 miles, and all in 15 minutes. The whole system of tracks need not be more than 4 or 5 feet in height. With sufficient power the scheme is practicable, and with motors at present at our command it would work for short distances.

The German sewing machine manufacturers have organized an association for the protection of their interests. Notwithstanding the alleged cheapness and superior quality of the German machines, the manufacturers admit that the German markets are full of imports from America, and to explain this they state that great prejudice exists in Germany against the native manufacturers. The German manufacturers turn out an average of about 400,000 machines yearly, and employ about 5,000 hands.

W. E. Judson, Cleveland, has made and sold this season 30 of his sectional assay furnaces. He will soon introduce a new pattern made of steel.



# The Iron Age

AND  
Metallurgical Review.

New York, Thursday, November 18, 1880.

DAVID WILLIAMS, Publisher and Proprietor.  
JAMES C. BAYLES, Editor.  
JOHN S. KING, Business Manager.

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Issued the FIRST and THIRD THURSDAY of every month.

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THOS. HOBSON, Manager.

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CHATTANOOGA.....Eleventh and Market Streets  
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The publishers of *The Iron Age*, 44 Cannon Street, London, England, will receive orders for subscriptions and advertisements on regular terms.

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- Thirty-fifth Page.**—Boston Hardware and Metal Prices.

The stress laid upon the importance of better sea-coast defenses by the Chief of Engineers of the United States Army, is out of all proportion to the actual necessity to which it calls attention. It is natural for the soldier to magnify the importance of military preparation, and to see danger to the nation in every headland and sand bar not occupied with a fortress bristling with improved ordnance. A better protection than these could give us is found in our distance from neighbors at once formidable and hostile, in our disposition to avoid entangling foreign alliances, and in the loyalty of a people ever ready to rush to arms in defense of the country against foes without or within. Our last war taught us the value of our works, and showed how quickly these could be thrown up in case of need. As to guns—well, we are behind Europe, but probably we can afford to stay so for the present.

It is just as well to let England waste millions of treasure annually in experimenting on guns, armor and projectiles, as to spend it ourselves. When she has found out all that is worth knowing, we shall be in a position to spend some money to advantage. Fortunately, the power to declare war rests with the civil and not with the military authorities. As against foreign war ships, torpedoes are a better defense than fortifications. Since they were introduced war vessels have not cruised around in hostile waters with the same freedom as formerly, and of late years navies have been of comparatively little use for aggressive purposes. During the Franco-German war, the navies of both powers lay idle in their respective waters. On the whole, we are not so badly scathed as the army engineers seem to be.

### Great Britain's "Revenue Tariff."

Very few of those who speak of Great Britain as practicing free trade, have any correct idea of the variety or amount of the duties charged on imports at British ports. The following is the list of dutiable articles and the duties they are required to pay:

| Articles.  | Duties. |
|--|---------|
| Ale or beer, specific gravity not exceeding 105°.....                    | 8 0     |
| Ale or beer, specific gravity exceeding 105°.....                        | 11 0    |
| Ale or beer, specific gravity exceeding 105°.....                        | 16 0    |
| Beer, mum, per barrel.....   | 1 0     |
| Beer, spruce, specific gravity not exceeding 110°.....                   | 1 0     |
| Beer, spruce, specific gravity exceeding 110°.....                       | 4 0     |
| Cards, playing, per dozen packs.....                                     | 3 9     |
| Chicory (raw or kiln dried), per cwt.....                                | 13 3    |
| Chicory (roasted or ground), per pound.....                              | 0 2     |
| Chloral hydrate, per pound.....  | 1 3     |
| Chloroform, per pound.....   | 3 0     |
| Cocoa, paste and chocolate, per pound.....                               | 0 2     |
| Cocoa, paste and chocolate, per pound.....                               | 0 2     |
| Coffee, raw, per cwt.....  | 14 0    |
| Coffee, kiln dried, roasted or ground, per pound.....                    | 0 2     |
| Colloidal, per gallon.....   | 1 4     |
| Essence of spruce, 10 per cent. ad valorem.....                          | 0 0     |
| Ethyl, iodine of, per gallon.....  | 13 0    |
| Ether, per gallon.....   | 1 5     |
| Fruit, dried, per cwt.....   | 7 0     |
| Malt, per quarter.....   | 1 4     |
| Naphtha, purified, per gallon.....                                       | 10 5    |
| Pickles, in vinegar, per gallon.....                                     | 0 1     |
| Plate, gold, per ounce.....  | 17 6    |
| Plate, silver, per ounce.....  | 1 6     |
| Spirits, brandy, Geneva rum, &c., per gallon.....                        | 10 5    |
| Spirits, rum, from British colonies, per gallon.....                     | 10 2    |
| Spirits, cologne water, per gallon.....                                  | 16 6    |
| Tea, per lb.....   | 0 6     |
| Tobacco, unmanufactured, per pound.....                                  | 3 13    |
| Tobacco, containing less than 12 per cent. of moisture, per pound.....   | 3 6     |
| Tobacco, Cavendish or Negro-head, per pound.....                         | 4 6     |
| Tobacco, other manufactured, per lb.....                                 | 4 0     |
| Tobacco, cigars, per pound.....  | 5 0     |
| Snuff containing more than 12 per cent. of moisture, per pound.....      | 3 9     |
| Snuff containing less than 12 per cent. of moisture, per pound.....      | 4 6     |
| Varnish containing alcohol, per gallon.....                              | 12 0    |
| Vinegar, per gallon.....   | 0 3     |
| Wine containing less than 20° proof spirit, per gallon.....              | 1 0     |
| Wine containing more than 20° proof spirit, per gallon.....              | 2 6     |
| Wine, for each additional degree of strength beyond 42°, per gallon..... | 0 1     |

It requires only a casual glance at this list to see that while the duties in this list are ostensibly "for revenue only," many of them operate practically as protective duties. This is further shown in the schedule of drawbacks which encourage British manufacturers.

The argument against protection to domestic industry by those who advocate a tariff for revenue only, is that it increases the cost to the consumer of articles covered by protection. Well, suppose we concede this for purposes of argument. It is as true of revenue as of protective duties. But let us look more closely. The government needs revenue, and desires a customs tariff as one means of raising it. It selects a certain number of articles and fixes a certain duty for each. If the articles selected are only those which are not produced at home, there can be no competition with foreign producers. The tax imposed is so much added to the cost of the imported article; the consumer pays that much more for it, and no one is benefited except the government. Now, suppose the duty is placed on an article which can be and is produced at home, though under conditions somewhat less favorable to cheapness than it is produced abroad. This duty is protective, and violates all the principles of British political economy. But how does it work? The protected industry, which may have previously languished, is quickly stimulated. Raw materials of native production have increased in value, capital finds profitable employment in building factories to work it up, labor finds more abundant employment at better wages, transportation companies are profited by increased freights, and the benefit extends in ever-widening circles until its influence is felt in all parts of the country. Presently the manufacture thus encouraged attains considerable proportions, the competition of the domestic product with the imported article becomes sharp, and prices are reduced in consequence. The domestic manufacturer, forced by the loss of his original advantage to produce cheaper, studies all the economies and makes rapid progress toward better standards of quality at lower prices than were before known. The duty ceases to be a tax, for though it stands chargeable against imports, the market is supplied as cheaply by home products as it could be from abroad. But let us suppose that prices would be lower were the duty abolished. The capital invested in manufacturing the protected article would become unprofitable, the raw material would decline in value, labor would be thrown out of employment or forced to accept wages disproportionate to the scale of comfort to which the industrious working classes of this country are accustomed, the price of the imported article

would advance on the strength of an increased demand, and the tax which protection wiped out would be reimposed by free trade. But the injury would not stop here. The mischief resulting from the destruction of a profitable and prosperous industry would be as far reaching as were the benefits of its prosperity.

This is the whole question in a few words. A duty imposed for revenue only is a tax on consumption as long as it stands, with no benefit to the consumer. A duty imposed for protection is a tax until protection has accomplished the industrial development it was designed to promote, and then it ceases to be a tax, because the imported article is displaced by the domestic, and the competition among domestic producers keeps the price down. The revenue duty merely adds so much to the national taxes, without in any way increasing the tax-paying power of a country. The protective duty sends the thrill of a new life through the national pulses, and, by creating wealth and giving an increased value to native resources, increases by so much the power of the people to bear taxation.

The whole argument in favor of a revenue tariff and against a protective tariff is utterly dishonest. We can understand and respect the views of a man who advocates free trade. His views may be impracticable, but he can give a reason for them which is intelligent. But if it be conceded that it is either necessary or desirable for a government to impose customs duties, no one can both honestly and intelligently maintain that it is not better to so adjust those duties that they shall result in incidental benefit to the country by increasing its production, adding to its wealth and enlarging its tax-paying ability.

The fundamental fallacy of the free-trade argument was pointed out some time ago in these columns. It is that the interests of a people as consumers are paramount to their interests as producers. This we deny, and the fact that every progressive and prosperous people produce more than they consume proves our position. But were it true that the individual has interests as a consumer which are more important than his interests as a producer, the argument would not justify a revenue tariff any more than it would a protective tariff, although it might be held to prove the wisdom of absolute free trade. But absolute free trade is something no country thinks of, much less Great Britain. Probably she is not in a position to profit by protective duties. Her manufacturers want labor cheap, and have no desire to see the masses of the people prosperous and comfortable if comfort and prosperity mean better wages. They must manufacture cheaply or not at all. But what may be good for England is not good for us; and we repeat that the movement in favor of the abandonment of protection and the substitution thereof of a tariff for revenue only, which was so emphatically and unmistakably rebuked by the people at the recent general election, seeks simply to betray American interests into the hands of British producers.

### The Development of Mexico.

Those who are seeking to secure aid from capitalists in this country for the building of railroads in Mexico, have found a powerful ally in Gen. Grant. At a recent reunion in this city, Gen. Grant pleaded for increased importation facilities in quite an eloquent speech of exceptional length. Although inaccurate in some of its details, the argument was, on the whole, a sound one, placing the subject in a new light.

All who have visited our sister republic agree that her resources are both boundless and varied, and all concede that in the absence of any navigable rivers, the only means of opening out the country is by means of railways. There is, furthermore, little doubt that the trade created by a development of Mexican agricultural and mineral resources will be one of great and growing importance, that the country which aids chiefly in that development will secure the greatest share, and that no country is so favorably placed as our own in any efforts it may make to obtain the Mexican trade. Upon these grounds it is urged that nobody has so direct an interest and so fair a prospect of success in building railroads for the Mexicans as the capitalists of the United States. This is the view taken by Gen. Grant, and he distinctly and emphatically states that those who enter upon the undertaking must not look for any aid in the shape of subsidies from the government; in fact he claims that it would be better to do without them, even if they could be obtained. It has been a favorite argument to point to the rapid growth of agriculture and industry along new lines of road in the West as an instance of the effect of the extension of railways upon trade, and to draw from it the conclusions that similar results might be looked for in the case of Mexico also. We cannot see the force of this comparison. Circumstances were exceptionally favorable to the development of our Western States. There is not in Mexico the class of men who have turned the prairies into vast fields of corn and wheat. The docile, indolent and ignorant Mexican Indian may do well enough as a laborer working for 50 cents a day on the railway, but he will never play an important part in colonizing and developing the country opened out. Nor will a flood of immigration follow the extending line of road. Little can be hoped for from the great bulk of the population—the Indians—

who number nearly 7,000,000 out of a total population of 10,000,000.

Gen. Grant takes pains to deduce, from a history of Mexico during the present century, that her people have not until now had a fair chance to show their aptitude for business. He argues that it is a credit to them that they are not worse than they are. While it is only just to give the Mexicans credit for their success in expelling from their soil a well-organized army of invaders, and for shaking off the yoke of a rich and powerful priesthood, it cannot be denied that they have shown little talent for an enlightened self-government. Their political institutions are certainly not now calculated to inspire much confidence. Congress is swayed by violent and intolerant factions, and the central government has lost all control over those States which are not readily accessible. While, therefore, the country itself holds out tempting inducements, the bulk of the population, though industrious and peaceful, are lacking in enterprise. A considerable portion of the intelligent classes seek excitement and spoils in political brawls, and only a minority are active, pushing and intelligent business men.

These facts should not be lost sight of, and therefore it would appear reasonable to suppose that the best mode of approach is from a base line in this country. This is what is being done. Sonora, one of the northern states of the republic, is being opened out by a line connecting the port of Guaymas with the American system of railways, which will soon be materially strengthened by the completion of the Southern Pacific Railroad. This will open a state the mineral and agricultural wealth of which is well known, whose inhabitants are comparatively vigorous and enterprising, and are very little hampered by any changes going on in the capital. A steady and cautious progress southward, in proportion as the country is being developed, would be the safest and most economical method of bringing Mexico within the range of our industrial activity, and conferring upon both countries the benefits of a close and remunerative business intercourse.

### The Suez Canal and British Steamers.

The Suez Canal, in common with all great modern achievements, has, in the course of time, wrought industrial and mercantile changes much greater than were at first believed possible or probable, and its influence in shaping and stimulating trade with the extreme East, has undoubtedly been as powerful and effective as has been that of the Pacific Railroad in the internal business relations of the United States. Equally great would be the changes brought about in Eastern commerce if, in the near or remote future, the Euphrates valley railway, long ago projected, should become a reality, for it would withdraw from the Suez Canal much of the importance it has acquired during the past twelve years.

But, aside from the commercial revolution it has accomplished, the Suez Canal has had a great stimulating influence upon iron steamship building, especially in England. The exigencies of the canal and the abandonment of the Cape of Good Hope route, threw out of employment quite a number of iron steamers at the time, and created a special fleet of steamers, built not only with English money, but with Dutch, French, Italian and Spanish, the steamers of these nations now regularly trading through the canal having been all built in England. Probably there are a couple of hundred ocean steamers that have been built during the past twelve years in England now regularly making the Suez transit, and several of them trade between China, via the Straits and Ceylon, and New York. But this is not all. There is the Australian trade and the large traffic between London and the Cape, leading to the creation of a magnificent fleet of large steamers, to which will be added, within the next few years, the new large Atlantic steamers which the enormous increase of the American export trade in articles of food and the enlarged passenger movement demand, not to speak of the intercolonial, Mediterranean, South American, Mexican and West Indian fleets.

Steel, whose cheapened production comes with this great impulse to steamship building, seems destined to gradually supersede iron as a material, a new feature which will have a great bearing on the building operations of the future. A few figures will show the magnitude of this ship-building interest on the Clyde, for example. In 1875, 220 iron ships were built there, 113 of which were steamers, measuring, together, 107,000 tons, and 107 sailing vessels, measuring 103,000 tons; 1874 exceeded this total with 262,000 tons. Then the strikes occurred. In 1878 there were built at Glasgow 163 vessels of, together, 118,000 tons, and at Greenock 57 vessels of, together, 31,000 tons. The total tonnage of the Clyde was 188,000 tons; in 1879 it reached 215,000 tons.

The continual improvements and changes to which the iron and steel-clad navies of the leading, as well as the minor, European nations have been compelled to resort, and the many new ironclads built for them, have not only enriched English builders, but they have added to their experience in this particular industry. Their facilities are now so perfect that it would be difficult, if not impossible, for any other nation in Europe or America to compete with them at present

or in the near future in this branch. Much has been said and written on this side lately as to what ought and might be done here in it, but we are afraid it would be too late, even granting that our facilities in the way of material were as great. Iron shipbuilding has become a specialty in England, and has attained such perfection and such rapidity of execution that it will not be easy now for any other nation to obtain a foothold in this industry.

### Checks for Small Payments.

There is no merchant whose customers are scattered over a large extent of country, who has not realized the need of some more convenient method of transmitting small and odd sums of money through the mails. The old fractional currency is well-nigh redeemed. It is unsafe to send bills for even dollars, and too bulky to use small coins for fractions of dollars. Checks can be sent where the party keeps an account, but the sender too frequently forgets to add the twenty-five cents demanded for collection, which, in most cases, is an outrageous and extortionate price to pay for the accommodation. True, money can be sent by post-office order or by registered letter, but it is troublesome to send for the order or letter, and in cases of small sums the charge of the post office is quite a percentage of the sum sent. What is needed is some safe, ready and inexpensive method of sending such small sums.

The London Cheque Bank provides such a method for Great Britain. This bank issues checks that are good for any amount up to a certain sum, say £1. For a book of one hundred such checks the buyer would make a deposit of £100. When the checks are returned to the bank the account is charged with the actual amount for which it is drawn, and when the hundred are returned the balance is subject to the draft of the depositor. Prof. Stanley Jevons, speaking of this bank, says:

Not only do people now draw very small checks in their own check books, but if they happen not to possess that luxury, they walk into a neighboring stationer's or draper's shop and ask for a Cheque Bank check, which is simply filled up and handed over in exchange for the money without more ado. This check may be posted to almost any part of the habitable world, and will be worth its inscribed value, for which most bankers, hotel-keepers and other business people will cash it, irrespective of advice notes and localities.

A bank of a somewhat similar character might be established in this country. One difficulty would be the extent of the country and the well-nigh impossibility of scattering the checks all over the country. A better way, it seems to us, would be through the post offices, using a method similar to that of the Cheque Bank. In all of the large cities and towns, at least, arrangements might be made to receive money on deposit and issue checks that would be good either at all post offices or at certain specified ones. In a word, the adoption of the Post Office Savings Bank system of England, with some modifications, would meet this want. We do not propose to discuss the details of the plan, but simply throw out the suggestion for thought.

### A National Bankruptcy Law.

The movement originating in Boston last winter to secure the enactment of a general registry law is said to have acquired important support, and is to be pushed this winter with renewed vigor. A draft of the proposed law was sent to all parts of the country, and suggestions and criticism invited. The responses thus called out have been carefully considered, and have, so far as approved, been embodied in a new bill. Among the most important points of this bill we note the following: The powers of Registers in Bankruptcy are considerably increased, and they are virtually made judges in the matters brought before them. They are to be paid salaries instead of fees and commissions. Assignees receive no commission or percentage, but only such compensation as the creditors shall agree to and the court approve. It is believed that by abolishing fees the chief objections to the former law will be removed, and no one will have any interest in securing in delaying settlements and encouraging tedious and costly litigation. It is intended that the costs of any case in bankruptcy or composition shall be so adjusted that they can be calculated in advance with a close approximation to accuracy. A clause is introduced into the bill which makes it a crime for creditors to knowingly permit fraud upon other creditors by proving false claims, or receiving money or other value as consideration for acting or refraining from acting in the selection of an assignee, the acceptance of a composition or the discharge of a bankrupt. Dividends which remain unclaimed for six years are paid over to the United States. We think they should be paid over to the bankrupt, his heirs or assigns, except in cases where there are no legal claimants. We have not yet had time to examine the bill so fully as to feel certain whether we can advocate its passage without amendment, but shall presently lay the full text before our readers. A good general bankruptcy law is eminently desirable, but one which is not good, or which is so loosely drawn as to permit fraud and encourage dishonest failures, will be more objectionable than none at all.

The question whether the manufacturer of tin cans and other vessels of tin plate is



entitled to a drawback of duties paid on the plates, provided he uses therewith certain domestic materials, such as solder, wire for bales, wood for hand-pieces, &c., has been referred to us, and as it is a question of some general interest, we cannot do better than to answer it in our columns. Under the act of March 10, 1880, amending section 3020 of the Revised Statutes, cans, &c., manufactured in part of imported materials, are entitled to the drawback provided for in section 3019, in all cases where the value of the imported material used in the manufacture is not less than 70 per centum of the value of all the materials so used. In other words, the manufacturer of tin cans and other vessels of tin plate for export, is entitled to a drawback on the tin he uses if the domestic materials combined with it are worth less than 30 per centum of the total value of the materials used in the articles manufactured. There is really no good reason why the law should not be further amended to permit the repayment of duties on re-exports, however much or little it may be. If a manufacturer for export uses of foreign materials which have paid duty only 10 or 5 per centum of the domestic materials used with them, he should have the duty thereon refunded. But we did not propose to discuss the equities of the case; we intended merely to state the facts. The present law, as we have said, allows the drawback on foreign materials exported as manufactures where the value represents not less than 70 per cent. of all the materials used.

In our report of the meeting of the American Society of Mechanical Engineers, in speaking of Mr. Lyne's paper on "Packing for Piston Rods and Valve Stems," we quoted him as referring to James Watt as the inventor of the modern stuffing box, with its cavities beveled at top and to an angle of 60 degrees. Mr. Lyne sends the following extract from his paper, and calls our attention to the fact that he does not allude to James Watt as the inventor of the stuffing box, as we understood when making the report:

The piston engine was first invented in 1710 by Thomas Newcomen and John Cawley, of Dartmouth, in Devon. This engine was single acting, and passed through numerous stages of improvement until the year 1781, when James Watt invented and built a double-acting steam engine. Previously, however, Watt had made use of the stuffing box, which was the invention of Sir Samuel Morland, for packing piston rods. In a letter to Smeaton, dated April, 1766, Watt explains the difficulties encountered in making a tight connection, allowing the piston rod to move freely. In the engine which was built in 1781, Watt, as a result of his previous experiments, bored a cavity in the cylinder head similar to those in use at the present time, the bottom of which was beveled at an angle of about 60 degrees to a line parallel with the face of the cover.

Mr. Lyne has followed Dr. Lardner's statement, who, as he remarks in a private note, does not give any authorities nor dates. It appears from the examination of very ancient mechanical works, that most of the common mechanical devices are very old. Indeed some that are considered recent can be traced for at least 200 years. Strap ends, fly wheels, flanges for bolting parts together, cocks, clack and poppet valves, cranks and connecting rods, guides and a multitude of other things of a similar character were probably used long before the modern machinery epoch began.

Mr. Lyne also calls our attention to the fact that the paper on "Mechanical Correctness" was read by Mr. C. A. Hague instead of Mr. Hamenway, as we stated.

#### Sulphur in the Basic Process.

The following letter from Mr. Sidney G. Thomas, one of the patentees of the basic process, will be read with interest. It would have appeared sooner, but was mailed to Pittsburgh instead of New York by a mistake of the writer:

To the Editor of The Iron Age.—SIR: In a recent issue I observe you quote a single analysis, said to be by Prof. Kupelwieser, of a "basic" Bessemer blow which seems to show that sulphur may be actually increased during a dephosphorizing operation, from which you draw the deduction that sulphur may prove a *bête noir* of the process. I have not, so far, seen the original report of Prof. Kupelwieser from which you quote, but, assuming that the sulphur record in question is not merely due to a misprint, I can only conclude it must arise from an error in the sampling or analysis. My reasons for this opinion are these: Hundreds of analytical examinations of the course taken by sulphur in the dephosphorizing process have been made, not only by those connected with the process, but by a host of eminent chemists and metallurgists of all nations, desirous of making independent examination of the chemical features of the operation. In no case, however, has it happened to my knowledge that so anomalous and contradictory a result as such an increase of sulphur percentage has been even suggested. That so great an increase as is indicated could take place is, indeed, almost incredible. Whence could it arise? It is well known that an apparent small increase is shown in the ordinary Bessemer process, but this is due, of course, merely to the waste of iron. That an increase to the extent of 100 per cent. should occur is almost impossible. I may add that the mean result of many scores of analyses shows that from 60 to 70 per cent. of the sulphur present in the pig is removed in the lime dephosphorizing process. If sulphur is ever not removed, it must be under very exceptional circumstances that I have so far not encountered, or when more traces of sulphur are present in the pig treated. That it could be ever increased in dephosphorizing is utterly contrary to all probabilities and experience. Finally, as

sulphur is readily removed in the blast furnace by well-known means, there is no apprehension of its causing trouble to steel makers in the subsequent operations.

Yours truly, S. G. THOMAS.  
Palace Chambers, Westminster Bridge, London, September 29, 1880.

#### Our Foreign Metal Trade During Eight Months.

The Bureau of Statistics at Washington has just published particulars of the foreign trade movement in the United States during the first eight months of the current calendar year, as compared with the corresponding period in 1879. We have extracted therefrom all items relating to the import and domestic export of metals and metal goods, leaving out the re-export as of little importance, and reducing values to thousands of dollars:

| Articles.           | Weights and Numbers. |            | Values.  |           |
|---------------------|----------------------|------------|----------|-----------|
|                     | 1880.                | 1879.      | 1880.    | 1879.     |
| Tin, cwts.          | 204,134              | 141,704    | \$4,645  | \$1,817   |
| Brass manuf.        | 27,991               | 28,374     | 283      | 174       |
| Copper ore, cwts.   | 2,791                | 2,791      | 137      | 137       |
| Copper ingots, lbs. | 4,458,156            | 74,049     | 676      | 8         |
| Copper manuf.       | 1,348,107            | 108,084    | 241      | 185       |
| Pig iron, lbs.      | 140,627              | 71,324     | 12,551   | 1,461     |
| Castings, lbs.      | 219,050,520          | 27,440,041 | 4,975    | 554       |
| Bar iron, lbs.      | 18,510,921           | 3,281,861  | 540      | 215       |
| Boiler iron, lbs.   | 48,554,778           | 100,843    | 990      | 2         |
| Hoops, &c., lbs.    | 221,039,491          | 3,471      | 3,471    | 2         |
| Sheet iron, lbs.    | 18,510,921           | 3,281,861  | 540      | 215       |
| Old scrap, tons.    | 347,999              | 15,774     | 32,423   | 304       |
| Hardware.           | 2,999,377            | 718,809    | 85       | 79        |
| Anchor, &c., lbs.   | 2,999,377            | 718,809    | 1,072    | 380       |
| Machinery.          | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Fire arms.          | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Steel ingots, lbs.  | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Rails, lbs.         | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Cutlery.            | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Saws and tools.     | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Other manuf.        | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Lead, lbs.          | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Lead manuf.         | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Mfrs. of metals.    | 189,504,924          | 29,409,046 | 1,260    | 268       |
| White lead, lbs.    | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Litharge, lbs.      | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Tin plates, cwts.   | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Mfrs. of tin.       | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Spelter, lbs.       | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Sheet zinc, lbs.    | 189,504,924          | 29,409,046 | 1,260    | 268       |
| Other goods.        | 189,504,924          | 29,409,046 | 1,260    | 268       |
|                     |                      |            | \$405,08 | \$311,519 |

| DOMESTIC EXPORT.     |         |            |          |
|----------------------|---------|------------|----------|
| Articles.            | 1880.   | 1879.      |          |
| Bells and bronze.    | 14      | 9          |          |
| Brass mfr.           | 14      | 9          |          |
| Clocks.              | 965     | 736        |          |
| Copper ore, cwts.    | 14,595  | 5,027      | 50       |
| Copper ingots, lbs.  | 274,471 | 13,549,827 | 51       |
| Copper mfrs.         | 14,595  | 5,027      | 45       |
| Gas fixtures.        | 14,595  | 5,027      | 25       |
| Pig iron, lbs.       | 451,077 | 716,781    | 18       |
| Bar, lbs.            | 100,011 | 879,905    | 5        |
| Boiler plate, lbs.   | 100,011 | 879,905    | 5        |
| Rails, lbs.          | 100,011 | 879,905    | 5        |
| Hoops, &c., lbs.     | 100,011 | 879,905    | 5        |
| Castings.            | 5,250   | 5,830      | 14       |
| Car wheels.          | 5,250   | 5,830      | 71       |
| Stoves.              | 5,250   | 5,830      | 5        |
| Locomotives.         | 5,250   | 5,830      | 5        |
| Steam engines.       | 5,250   | 5,830      | 5        |
| Boilers.             | 5,250   | 5,830      | 5        |
| Machinery.           | 5,250   | 5,830      | 5        |
| Nails and spikes.    | 5,250   | 5,830      | 5        |
| Other mfrs. of iron. | 5,250   | 5,830      | 5        |
| Steel ingots.        | 5,250   | 5,830      | 5        |
| Cutlery.             | 5,250   | 5,830      | 5        |
| Edge tools.          | 5,250   | 5,830      | 5        |
| Files and saws.      | 5,250   | 5,830      | 5        |
| Fire arms.           | 5,250   | 5,830      | 5        |
| Steel rails, lbs.    | 5,250   | 5,830      | 5        |
| Other steel goods.   | 5,250   | 5,830      | 5        |
| Lamps.               | 5,250   | 5,830      | 5        |
| Lead and mfr.        | 5,250   | 5,830      | 5        |
| Cannon.              | 5,250   | 5,830      | 5        |
| Carriages.           | 5,250   | 5,830      | 5        |
| Shot and shell.      | 5,250   | 5,830      | 5        |
| Argentine's ore.     | 5,250   | 5,830      | 5        |
| Cwts.                | 5,250   | 5,830      | 5        |
| Plated ware.         | 5,250   | 5,830      | 5        |
| Printing presses.    | 5,250   | 5,830      | 5        |
| And type.            | 5,250   | 5,830      | 5        |
| Quicksilver, lbs.    | 5,250   | 5,830      | 5        |
| Scales.              | 5,250   | 5,830      | 5        |
| Sewing machines.     | 5,250   | 5,830      | 5        |
| Fire engines.        | 5,250   | 5,830      | 5        |
| Mfrs. of tin.        | 5,250   | 5,830      | 5        |
| Watches.             | 5,250   | 5,830      | 5        |
| Zinc ore, cwts.      | 5,250   | 5,830      | 5        |
| Sheet zinc, lbs.     | 5,250   | 5,830      | 5        |
| Other goods.         | 5,250   | 5,830      | 5        |
|                      |         |            | \$59,547 |

From these tables it appears that during the period named the import has been \$70,345,000 this year, against \$17,004,000 last year, or about four times what it was then, and the domestic export \$12,822,000, against \$15,684,000, a falling off of 10 per cent. There has been an increase of note in the importation of tin, copper, pig iron, merchant ditto, rails, scrap iron, steel, tin plates, lead and spelter, and a notable decrease in the exportation of copper and quicksilver, other items showing little change.

#### Treasury Rulings on Steel Duties.

(From Our Own Correspondent.)

WASHINGTON, D. C., November 12, 1880.

Daniel J. Morrell, of Pennsylvania, who has been in Washington for several days, had a conference with the Secretary of the Treasury respecting the duties on steel-wire rods in coils. He frankly informed the Secretary that he did not think that the "Schedule E, Metals," was in many respects, construed in the interests of American manufacturers, and that the mills manufacturing this article of steel were closed because they could not compete with the foreign makers. Mr. Morrell, therefore, asked a construction of the law more favorable to this branch of industry, and specifically an increase of duty, in the words of the statute, from "Steel in any form not otherwise provided for, 30 per cent. ad valorem; provided that no allowance or reduction of duties for partial loss or damage shall be hereafter made in consequence of rust of iron or steel or upon the manufacture of steel, except on polished Russia sheet iron," to 2½ cents a pound under that provision of the same statutes which says: "Steel in ingots, bars, coils, sheets and steel wire, not less than one-fourth of 1 inch in diameter, valued at 7 cents per pound or less, 2 cents and one-fourth per pound; valued at above 7 cents, and not above 11 cents per pound, 3 cents per pound; valued at above 11 cents per pound, 3½ cents per pound, and 10 per centum ad valorem." At the department it is claimed that at the rate of 2½ cents per pound the particular class of manufactures of steel alluded to by Mr. Morrell—that is, steel-wire rods in coils—would reach 125 per cent. ad valorem.

A question having arisen respecting the assessment of duties at the rate of 45 per cent. ad valorem on two steel shafts manufactured by Krupp in Germany, the acting Secretary of the Treasury, as there is no specific provision in the tariff for shafts, and as the shafts in the present case are

obviously covered by the provision for manufactured steel, has affirmed the decision of the collector of customs at New York, and he is ordered to take measures for the collection of the additional duties. It appears that the articles in question are described on the invoice and entry as axles; that the appraiser returned them as steel shafts for steamers, manufactures of steel, and that the importers claimed that they should be classified under the provision of the tariff "for axles or parts thereof," and treated as dutiable at the rate of 2½ cents per pound only.

In his decision Judge French says: "The articles may be described as crank screw or propeller shafts, by means of which motion is given to the propeller; that after due consideration of the reports which have been obtained from various experts and officers of the department, and of the definitions given by lexicographers and other authorities to the terms 'axle' and 'shaft' respectively, the department is satisfied that there is a recognized distinction, commercial and otherwise, between the two designations, and that, in view of the decisions of the courts requiring the classification of articles for the assessment of duties according to the commercial understanding of the term used (2 Abbott's Dig., 188), and to its common, every-day meaning (U. S. vs. Clayton), shafts like these, which are to be used to transmit power to a propelling wheel, cannot properly be classified under the provision of law above quoted for axles."

The Secretary of the Treasury on the appeal from the assessment of duty at the rate of 1¼ cents per pound on certain car truck channels reports further:

The appraiser reports that the merchandise consists of pieces of rolled or hammered iron, about 7 feet long by 10½ inches wide, with flanges on each side and holes punched so as to fit them for immediate use.

From this description of the articles, which appear to be completely manufactured and intended for a specific purpose, the department is of opinion that they are entitled to entry at the rate of 35 per cent. ad valorem as "manufactures of iron."

You are therefore authorized to adjust the entry accordingly, and to forward a certified statement for a refund of the excess of duties.

#### Strength in Machine Tools.

Mr. Charles T. Porter, in his paper before the American Society of Mechanical Engineers at its last meeting, offered the following valuable suggestions:

As one subject of primary importance, I wish to present that of strength in machine tools. Truth of construction, facility of operation, and range of application are all, in one sense, subordinate to this fundamental quality of strength; for they are in a greater or less degree impaired where adequate strength is not provided.

But what is adequate strength? On this point there exists among the makers and users of tools a wide diversity of opinion. And on examination it will be found that this diversity coincides with the diversity in mechanical sensibility. As the mechanical sense is developed, there arises in just the same degree the demand for greater strength in machine tools.

To the mechanic who has never formed a notion of division of an inch more exact than "a bare 32nd," one tool, if it can in any way be kept from chattering, is as good as another, and better if it is cheaper.

To those, on the other hand, who demand in every piece, as it comes from the tool, the closest approach to perfection, both in form and finish, a degree of strength in the tool appears, and is demonstrated, to be indispensable, that to the former class seems as absurd as the results attained by means of it appear incredible.

In this country, as indeed all over the world, the standard of mechanical truth has been very low. It is here, however, as everywhere, rapidly rising. The multitude are being educated up to the standard of the few. In this work members of this Association have borne and now bear an honorable part. Just in the degree that the standard of mechanical excellence is raised must the demand become more general for greater strength in machine tools, as indispensable to its attainment.

But what is the standard of strength? The anvil affords perhaps its best illustration. It is a strength enormously beyond that which prevents a tendency to chatter, a strength that under even the heaviest labor prevents the least vibration of any part of the tool, or any indication of effort, more than if the object being cut were a mass of butter.

It will be seen that this absolute solidity in machine tools, while truth cannot be attained without it, enables also mechanical operations generally to be performed with far greater expedition, and the subsequent work of the finisher to be in any case much diminished, and often dispensed with entirely.

We are enabled, in most cases, to come at once to the form desired, whatever may be the quality of material to be removed, and always to finish the surface with a degree of truth and polish otherwise unattainable, dispensing, in a great measure, with the use of that abomination, the file.

Now with this standard in our mind, we look over the face of the land, and behold it covered with rubbish.

It is curious to observe how ingenious tool makers have generally been in trying to avoid this quality of strength, and how deceptive an appearance in this respect many tools present.

It is interesting also to note how little this quality of solidity adds to the cost of casting.

The addition is merely so much more pig iron, and really not that, because in the stove-plate style the forms are more complicated, the patterns more expensive and frail, and the cost of molding is greater. But what signifies even a considerable increase in the first cost of a tool that in daily use is to perform the work of many, and is to place its possessor on a mechanical eminence?

It is not the purpose of this paper to enter into details, interesting and important as they are, but to draw attention to the subject in a general way. The improvement observed quite recently in this respect, as well as in

other points of tool construction, is highly gratifying, and encourages the expectation of still further and more general progress.

#### American Tin Plate Manufacture.

Another very hopeful movement is in progress, under excellent auspices, looking to the resumption of the manufacture of tin plates in the United States as a permanent industry. A strong business firm is interested, and has laid down a mill for the production of American iron of the finest quality. All the latest improvements are provided for in the plant, which is so near completion that samples of sheet iron will be submitted for inspection within a few weeks at furthest. The practical men on whom the sole reliance for success depends, have had long experience heretofore in Europe, and within the last two or three years have thoroughly tested the manufacturing ability of the United States, as well as the quality of the iron which we are capable of producing. The concern referred to is known as the Monitor Tin Plate and Galvanizing Works, of which C. C. Davies is president, and Wm. J. Griffiths, superintendent. The first president was Mr. Chas. E. Dodge, formerly of the firm of Phelps, Dodge & Co., but a reorganization took place about a year ago, Mr. Dodge finding that other interests claimed his attention. His successor, Mr. Griffiths, is a gentleman well qualified for his present position. He was for many years in charge of the tinning department of the Iron Clad Manufacturing Company, and was for seven years or thereabout with J. D. Lock, at Whitestone, L. I., where he introduced important improvements. Afterward he engaged in the business on his own account in New York City.

An Iron Age reporter called upon Mr. Griffiths yesterday, and inquired as to the special difficulties experienced in making tin plates, and why there had been a temporary suspension in their manufacture. The difficulty, he said, was in the iron—there was too large a percentage of waste for one thing. In the old country they allow 10 per cent., but here it had been considerably greater. The iron was rough, blistered, and had an unfinished surface. He explained further that when the iron took place, the rolling mills found themselves full of orders, taxed far beyond their capacity, and they naturally gave a preference to those orders which required the least care and difficulty in filling them.

The waste in the iron above referred to was occasioned by defects in the surface after the sheets had passed through the black picking to remove the oxide. If not properly cleaned, the cold roll would put a fine glossy surface only in certain parts, leaving patches. Then in the white picking, before the tinning process, the same defects would appear. These, among other details, are spoken of to show how many points must be guarded in order to turn out perfect plates, and that none but workmen of experience can be expected to excel.

"The great trouble with American iron," said Mr. Griffiths, "is that we don't get it solid. If it were solid and welded thoroughly, it wouldn't blister, because when it goes through the metals with which it is coated the hot air expands the iron and the blister arises." He added, by way of explanation, that there was nothing discouraging in this, only as it shows that we have much to learn in the manufacture of prime tin plate iron. We are already making fine sheet iron, equal to any in the world, but not of the quality suited to tin plate. Mr. Griffiths, however, is satisfied that we shall shortly produce American tin plate equal to any imported. It is his ambition to tin nothing but iron of American production.

High encomiums have been bestowed heretofore when several of our largest firms were supplied with tin plates of American production. Experts were employed by them to examine indiscriminately lots of American and foreign plate, after all brands or other means of identifying them had been removed, and their decision was in favor of the "Monitor" production. They did not find the "pin holes" so commonly observed in foreign plates.

Reverting to the "waste" of sheets before mentioned—meaning the rejection of a large percentage because of defective surface—Mr. Griffiths attributed it wholly to neglect or indifference on the part of workmen who handle them before the plates are cold rolled. He insisted that it had "nothing to do with the iron." One trouble here is that the manufacturers, after gaining a favorable exportation, become lax. "If they only make a serious and persevering effort," said he, "they will turn out plates equal to the first standard quality. They have but to realize what is possible in the future development of this great industry—the magnificent field which here awaits them." To illustrate, one firm here in New York imported \$450,000 worth of tin plates in a single year, for dairy purposes alone, to make linings for milk vats, &c. Neither one or a half dozen large establishments here could supply the demand, in the absence of foreign supplies.

At present we cannot hope to compete in the ordinary sizes. The first thing is to establish the business in odd sizes adapted to the work for which they are wanted, so that there shall be no waste in cutting, as it makes a great difference whether the plate cuts within a sixteenth or quarter of what is required. When under full headway the "Monitor" concern melted over 20 tons of tin per day, the larger proportion of which went into plates. Success in the renewed attempt is anticipated with full confidence, as the workmen employed are of long experience and the plant will lack nothing in equipment and appurtenances. The capital at command is said to be ample.

Japanese Iron.—It has been a very general idea, remarks a Japanese native paper, that Japanese iron was of so inferior a quality that the raw material could only be worked up at a loss; the Public Works Department consequently used to employ imported iron. Recently, however, the iron from the Kanabai mines, in the prefecture of Iwate, has been found to be of so good a quality that experiments are now being made in the work-

shops of the Department with the view of its ulterior adoption.

#### SCIENTIFIC AND TECHNICAL.

Herr Haedicke, of Hagen, Germany, has been making some investigations on the causes of

SPONTANEOUS COMBUSTION OF COAL, which indicate that some of the views now held relating to the subject are erroneous. It has been quite generally believed that the decomposition of the pyrites often contained, finely distributed, in coal, and the increase of temperature due to that decomposition, were chiefly responsible for the greater number of accidents reported as having arisen from "spontaneous combustion." Herr Haedicke has endeavored to produce ignition of coal artificially, and though his experiments were conducted with materials differing in their nature from those in coal, his results are not without some significance. It should be stated that far from overrating their value, he insists that they be looked upon as preliminary only. He took small pieces of charcoal, soaked them in sulphate of iron and then treated them with sulphide of iron, thus impregnating them with a sulphide of iron. Placing them into a glass tube he exposed them to different temperatures, at the same time forcing a gentle current of oxygen through the tube. He found that ignition took place only after a temperature of about 300 degrees Celsius had been reached. Ozon did not cause an ignition at a lower temperature, nor did powdering the charcoal affect the general result. On the other hand, saturation of the oxygen with steam prevented any ignition, even at a temperature of 350 degrees. The result was a little different when the sulphide of iron impregnating the charcoal was produced by soaking it in an ammoniacal solution of sulphate of iron and passing a current of sulphuretted hydrogen over it. In this case the temperature of ignition was about 200 to 220 degrees, while sulphide of iron by itself ignited at 200 degrees. It is important to state that no combustion of the impregnated carbon took place when a current of atmospheric air was passed over it instead of a current of oxygen.

Dr. Hermann Wedding speaks emphatically on the importance of adopting

MECHANICAL MEANS FOR REMOVING THE SCALE FROM WIRE

after it has been annealed. In a Westphalian establishment the Altpeters scouring system was introduced in order to supersede partly the removal of scale by pickling. Formerly 18.5 parts of sulphuric acid was used in pickling wire rods and 6½ parts for wire drawn, for every 1000 parts of finished wire. After the introduction of the new process the consumption of acid decreased to 2 parts per 1000 parts of wire.

At a late national trial of hand fire engines Prof. Hartig made some experiments on

HUMAN POWER FOR SHORT INTERVALS.

The engines were worked by foot soldiers, on a warm day, and under an exposure to the direct rays of the sun. The mean velocity of the handles was 5.81 feet per second; the mean value of the effective work for each man 103.32 foot pounds per second, or about 4.1 times the value which Morin and Weisbach assumed for the average of eight hours' continuous labor.

From France come reports favorable to A NEW PROCESS OF TREATING AURIFEROUS ORES,

invented by A. M. Designolle. It is claimed that it will be particularly well adapted to working rebellious ores, although the long action required, 24 hours for a 10-ton charge, will raise some doubts in the minds of Western millmen. The idea is to substitute bichloride of mercury for the metallic quicksilver now generally used in amalgamation. Bichloride of mercury alone has no effect upon gold, but in the presence of iron the bichloride is at once decomposed and the mercury rendered free, which then forms an amalgam with the gold. The action is said to be rapid and complete, the ore being agitated in a barrel together with iron balls for 20 minutes. The contents of the barrel are then emptied into a second apparatus of special design, in which amalgamated copper plates retain the gold amalgam. The losses of quicksilver are reported to be low, but we suppose from the account given that it is this part of the process which consumes so much time, as the mercury must necessarily be in a very fine state of distribution.

#### Our Seacoast Defenses.

The annual report of the Chief of Engineers of the Army, after mentioning the fact that the amount heretofore appropriated for the protection, preservation and repair of sea-coast defenses has proved insufficient, and that many necessary works remained unexecuted at the close of the last fiscal year, proceeds at considerable length to argue the importance of being prepared for war. A single paragraph on this subject will show the nature of the Chief Engineer's argument:

When the great change in ships and their armaments was initiated after the commencement of our late civil war, Great Britain did not hesitate to appropriate \$40,000,000 for the defense of her most important harbors, and we may well profit by her example. There is nothing so costly to a nation as a lack of preparation for war. In fact, to be prepared for war will often prevent it; and though we may not feel the daily imminence of war with great foreign powers, as England did, yet with incomplete or inadequately armed defenses for our great seaport cities, even the attitude of belligerency, which we not unfrequently have to assume, has not the imposing effect it should have, nor is it accompanied with a justly founded self-confidence on our own part. The neglect of suitable preparation cost France many millions of treasure, a portion of her territory and great humiliation. The same must inevitably happen to the United States if it does not push forward its coast defenses and provide them with guns like those possessed not only by the great powers, but



even by smaller nations. \* \* \* In the event of war with a maritime nation, if we had no well-digested system of fortifications ready for use, the cruisers and war vessels of the enemy could run into our harbors, and, without landing, could either destroy the property along our shores or else lay our cities under contribution. We have a seacoast line of more than 3000 miles in extent on the Atlantic and Gulf of Mexico, and 1000 miles on the Pacific, not including Alaska, along both of which lie scattered all the great cities, all the depths of commerce, all the establishments of naval construction, outfit and repair, and towns, villages, and establishments of private enterprise without number. From these lines of sea coasts, navigable bays, estuaries and rivers, the shores of which are similarly occupied, penetrate deep into the heart of the country. The accurate detailed charts of our harbors and channels published by the United States Coast Survey are accessible to all nations, and are doubtless in their possession. There are foreign military and naval depots and arsenals in close proximity to our shores, and the arrival of armed vessels will follow in a few days, or even hours, the declaration of war. Thirty-six hours' steaming could bring them from Halifax, six hours could bring them from Havana, and six hours from Victoria, Vancouver's Island, could bring them in front of San Francisco, the Navy-yard at Mare Island, and the arsenal at Benicia. There might be little time for preparation to meet the assaults of these fast-running, sea-going, armored ships, ships clad with from 6 to 24 inches of iron armor, carrying rifled guns from 9 to 17 inches bore, which are more powerful than any gun we have in our service. With a fleet, or even a single vessel, of this kind in one of our harbors, it would be of no avail to collect troops in the city or town threatened. Suppose, with our railroad facilities, we could concentrate 100,000 men in 24 hours at the point threatened, of what use would they be against the armored ship? Suppose that in a night the men concentrated could throw up temporary earthworks and mount such guns as might be hastily mounted on improvised platforms—32-pounders, 42-pounders, 100-pounder rifles (even if it were possible to handle guns of this small size with the rapidity assumed)—what injury could all this do to the armored ship? The projectiles from such batteries would fall harmlessly from the side of the enemy. While lying, if need be, beyond the range even of our guns, with his 800 to 2000-pounders he would pierce such temporary parapets through and through, dismount the guns and explode any magazines of a temporary character. \* \* \* It will require much time and large expenditures to make the necessary modifications of our casemated works, and to complete our batteries and mortar batteries and furnish them with suitable armaments. It would be but an act of prudence to make the beginning without delay. The disasters of the first three months of a war under the present condition of our defenses might cost the nation tenfold the expenditure that would be needed to thoroughly protect our coast against attack. Our great cities—New York, Philadelphia, Boston, San Francisco, New Orleans, Baltimore and Washington—should they fall into the hands of an enemy, would suffer ten times more than the cost of all the forts necessary to secure them against such disaster. But such reverses would also be great calamities to the nation, crippling its war power.

**Spurious Brands or Numbers.**—There are few phases of the hardware trades of this country," says the *Ironmonger*, "more worthy of the righteous condemnation of all honest traders than the unscrupulous use of the trade-marks and numbers of successful manufacturers by dishonest rivals. This species of competition, which is in plain English can only be designated as fraudulent, is largely carried on even by persons who regard themselves as models of commercial propriety and honor. A manufacturer, we will assume, produces an article at a price which gives good value to the purchaser. He gives it a number, which, dating before the Trade-Marks Registration Act, cannot command a monopoly. His product is sent abroad, and foreign buyers, finding that the article numbered is always of reliable quality, order under that number. A rival maker discovers that there is a demand for this particular article, and sets himself to undersell the successful inventor. This is readily done by a sacrifice of the quality of the article. But the factor or merchant to whom the sham product is offered knows well enough that the article will not sell unless it bears the approved brand. The unscrupulous manufacturer easily surmounts this difficulty. He straightway brands his product with the number in question, and thereby deceives the foreign buyer. The dishonesty and injustice of this course cannot be too strongly condemned. If a manufacturer can beat his rival in the fair field of open competition, so much to his credit; but by taking such mean advantage as we have indicated, he deserves the utmost condemnation, and the merchant or factor who may encourage such dishonest practices shares equally with the manufacturer the moral guilt of the transaction.

Attorney-General Devens has recently decided the question as to the validity of the claim of the Wisconsin Central and other railroad companies of that State and Minnesota, to receive lands with which to make up deficiencies within the indemnity limits. It had always been the rule of the Interior Department to allow the land-grant roads to make good their quota of lands within the indemnity limits of their grant where there were lands sold in the odd sections lying along their line. When Mr. Schurz came in, however, he at once denied them this right, claiming that the companies were only entitled to receive so much of the land as remained unsold in the odd sections, without adding anything from the indemnity lands. This ruling deprived the Wisconsin Central of some 400,000 acres, which the decision of the Attorney-General now awards them. The case was argued before the Attorney-General on behalf of the State by Edwin A. Abbott, General Solicitor of the Wisconsin Central, whom Governor Smith appointed State's Attorney.

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## Large Stock of New and Second-Hand MACHINERY.

Three pair Scales, weigh to 3500 lbs. Fairbanks.  
One Horizontal Corlies Engine, 200 h. p.  
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Three Hor. Tub. Boilers, 4 ft. x 13 ft., 34 1/4 in. tubes

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One Hydraulic Press, 30-in. ram, in perfect order.  
One Lathe, 10 in. swing, 10 ft. bed. Fitchburg Machine Co.  
One Lathe, 14 in. x 35 ft. bed. N. Y. Steam Eng. Co.  
One Planer, 22 in. x 35 ft. bed.  
One Planer, 25 in. x 16 ft. bed. Chain feed.  
Two Crank Planers, 18 in. x 24 ft.  
One New Haven Drill. Will bore in center of 60 in.  
One New Haven Drill. Will bore in center of 30 in.  
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One Vertical Boring Mill, bore from 26 to 60 inches.  
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Two Slabbing Machines.  
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One Upright Drill, to the center of 64 in. (Patent).  
One Eighteen Drilling Machines.  
Ten Bench Lathes.  
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One Large Power Punch for bridge work.  
One 3000 ton Hydraulic Press and Pump.  
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One Punch and Shears combined, will punch 1 1/2 hole in 1-inch iron in the center of 30 in.  
One large Shears, will cut 3/4 iron any size.  
One Hand Punch. Pope's patent.  
Three Vacuum Tanks, 6 ft. x 12 ft.  
One hundred Vises.  
Five Portable Forges.  
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One Knowles Special Pump, No. 7.  
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30 in. x 6 ft., 20 1/2 in. tubes, shell and fire-box 3/4 in. heads 3/4 in. New.  
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15 1/2 x 36 Horizontal Engine, 9 ft. x 18 in. band wheel. Jacob Naylor.

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November List, No. 2.

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Lathe, 100 in. swing, 18 ft. bed.  
Lathe, 15 inch swing, 6 ft. bed. New.  
Lathe, 28 in. swing, 26 ft. bed.  
Lathe, 24 in. swing, 15 ft. bed.  
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Octagon, Square and Round, at less than market rates.

GLOBE HARDWARE CO.,  
53 Beekman Street, New York.

## NOTICE TO SHIPBUILDERS.

FOR SALE—One large DOUBLE PUNCH and SHEARS, one large set of BOILER MAKERS' ROLLS, used in construction of Stevens' Battery, Hoboken, N. J.

J. LEONARD,  
450 West Street, New York

## For Sale.

A complete stock of Shelf and Heavy Hardware, located in a live town in Central Ohio. Established 1850. "Good Payments." For particulars address

D. H., BOX 1077,  
Lima, Ohio.

## FACTORY

Or requisite buildings will be erected on plot 75,000 feet, on East Eighth Street, near the East River, and leased for a term of, say, ten years. Other New York City manufacturing property for sale or to lease.

WM. J. FRYER, JR., Etina Iron Works,  
104 Goerck Street, New York.

## Wanted.

A party owning a complete Rolling Mill desires a practical man, with \$25,000, as a partner to operate the same at or near Chicago, Ills. Address

THOS. McKILLIP,  
72 Washington St., Chicago, Ills.

**NOTICE.**—A Blast Furnace Manager and Chemist of 15 years' experience wants a situation. Satisfactory reference given. Address IRON,  
Office of The Iron Age, 83 Reade St., New York.

## Special Notices.

## ROOMS OF THE HARDWARE BOARD OF TRADE, LIMITED.

Incorporated A. D. 1877.

Nos. 4 and 6 Warren St., New York.

## To the Trade and Public:

We are compiling, preparatory to issuing in January, 1881, a limited number of strongly bound books, to contain the names and financial standing, as well as credit ratings, of some Fifty Thousand dealers in Hardware, Cutlery, Guns, Tinware and Stoves, Metals, Iron, Foundries, Machinery of all kinds (including Sewing Machines), Iron and Metal Pipe, Brass Fitting, Plumbers and Dealers in Plumbers' Supplies, and other trades kindred to these throughout the United States.

A large expenditure of money and the very best means have been used to obtain reliable information for the work, and those desiring it can depend upon the information being fresh and largely drawn from those selling the firms, corporations and individuals rated, and the information is as reliable as it is possible to obtain for such a work. For Wholesale Dealers and Manufacturers it is the most desirable work of the kind, as it is prepared with great care, and should be consulted where extended credits are asked. All are not safe for credit because apparently prosperous, and detailed information given at the office will largely aid in forming correct judgments.

The Board of Directors of this company have placed a limit to the number of these books to be issued, and under no circumstances will orders placed beyond that number be filled.

The subscription price to the book is placed at THIRTY DOLLARS. All orders must be accompanied by draft on New York for the amount.

We respectfully ask all who desire a copy of this book to forward their orders at once, as they will be entered and filled in the order received.

THE HARDWARE BOARD OF TRADE, Limited,

By JAS. H. GOLDEY, Actuary.

## FOR SALE.

The Best Retail Hardware Stock and Stand in Kansas City.

Is doing a good business.

## PRESENT STOCK ABOUT \$20,000.

Such an opportunity as this, for a couple of active, hard-working young men, with \$20,000 or \$30,000 capital, is seldom offered. Upon such goods as have advanced extravagantly, we will make such discounts from the present market rates that no one need hesitate about buying the stock from fear of a decline in prices. Address

J. E. FORBES & CO.,  
Kansas City, Mo.

**Bissell & Welles,**  
Wholesale Hardware Auctioneers,  
53 Chambers and 65 Reade Sts., N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading Manufacturers and Importers.

## For Sale.

HARDWARE.—The controlling interest of the whole of a Jobbing Hardware House, already established and doing a profitable business; located in one of the large Western cities. For further particulars, address

C. A.,  
Office of The Iron Age, 83 Reade St., New York.

## FOR SALE.

A works completely equipped for the manufacture of Carriage Axles. Is well located in relation to coal and iron, also very accessible to market. Address

E. P. BULLARD,  
14 Day St., New York.

## FOR SALE.

Job Lots and Bankrupt Stocks Hardware.

Great bargains offered to the trade.

A. W. WHEELER,  
141 Lake St., Chicago, Ill.

## Wanted.

A SECOND-HAND ENGINE for a Rolling Mill. Cylinder, 30 to 40 inches; stroke, 5 to 6 feet; with Main Shaft, Fly Wheel, &c. complete. Address

LOCK BOX 748,  
Pittsburgh, Pa.

## Wanted.

A PIG-IRON SALESMAN, of good address and experience in selling Western and Southern Irons. Address, immediately.

PIG IRON SALES,  
Office of The Iron Age, No. 83 Reade St., N. Y.

## Wanted.

A TRAVELING SALESMAN, thoroughly posted in Carriage and Saddlery Hardware and Blacksmiths' Supplies. Address, giving references, &c.,

HARRISON & KNIGHT,  
Minneapolis, Minn.

## Wanted.

TO BUY A HARDWARE BUSINESS, in a good, thriving county seat, where business is not overdone; a town of from 4000 to 8000 inhabitants; stock from \$12,000 to \$16,000. Address

THOMAS R. JONES,  
Box 158, Pomeroy, Ohio.

## Wanted.

TO PURCHASE 8 or 10 NAIL MACHINES. Please address, stating size, condition and price,

NAILER,  
Care of Jos. D. Weeks,  
Office of The Iron Age, 77 1/4 Ave., Pittsburgh, Pa.

## Sanderson Bros. Steel Co.

A limited number of shares for sale by EDWARD FAITH & SON,  
241 Pearl Street, New York.

**WANTED.**—A situation by a good Roll Turner; served his time at the trade, and has 24 years' experience. Address ROLL TURNER,  
Office of The Iron Age, 83 Reade St., N. Y.

## Special Notices.

## ONE MILLION ELEY BROS.'

Genuine First Quality

## BLUE CENTRAL FIRE

## CARTRIDGE CASES

NO. 12 GAUGE.

THE BEST PAPER SHELL IN THE MARKET.

For sale at a great bargain.

ALFRED FIELD &amp; CO.,

93 Chambers St., New York.

## To Iron Manufacturers

## FOR SALE.

The ROLLING AND PUDDLING MILLS of the late Hudson River Iron Co., at Foughkeepsie, New York. This property is well situated on the Hudson River and New York Central and Hudson River Railroad, and is in good condition for immediate occupancy. It contains all the machinery necessary for the manufacture of Merchant Iron, Rail and Bolt Spikes, Bolts, &c. Parties in search of this kind of property are invited to examine, and for other particulars to address

W. S. JOHNSTON, Trustee,  
Foughkeepsie, N. Y.

To Railroad Engineers, Importers and Others.

## DAVID OWEN,

Inspector of Steel and Iron Rails,  
Merthyr Tydfil, England.

Undertakes the inspection of Steel and Iron Rails, Permanent Way Materials, &c., &c., in England, Belgium and Germany. Thoroughly practical, of many years' experience. Can give very best of references from chief railroad engineers, merchants and others who have employed me to inspect their railroad materials during manufacture and delivery for the last 10 years. Correspondence solicited. Instructions by mail or cable punctually attended to.

## For Sale.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas.

Address  
HARDWARE,  
Box 166, Salina, Kansas.

THOSE WISHING TO BUY OR HAVE FOR SALE SECOND-HAND

## PRESSES or DROP HAMMERS

will please communicate with  
N. C. STILES,  
Middletown, Conn.

## The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,  
Issue Licenses to use the Process for the Manufacture of Iron and Steel

In the Bessemer Converter, Crucible, Siemens-Martin, Puddling, Blast and Cupola Furnaces.

The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of The Iron Age of Oct. 25th, 1877.

For Sale.

One of two stocks of Hardware, Stoves, Tinware and Agricultural Implements, situated one in Winfield, Kansas, and one in Douglas, Kansas, both doing a good business; stock about \$5000 each; good reasons for selling. None but cash buyers need address

D. B. ROSE,  
Winfield, Kansas.

## For Sale.

In Southern Central Iowa, the only wholesale and retail

## Heavy and Shelf Hardware Store

at the county seat of a county containing 10,000 inhabitants, is offered at reasonable figures. Business established for 30 years. Cash customers only need apply. Address, J. STEELE,  
Office of The Iron Age, 83 Reade St., New York.

## ENGINE AND BOILER FOR SALE.

Steam Engine, 6 x 12, with 12-horse-power boiler, feed pump and heater, nearly new and in good order. One (1) second-hand "Peck" Lifter, not geared; will raise hammer of 300 lbs. in weight.

BEECHER & PECK,  
Lock Box 122, New Haven, Conn.

## Just Published.

## STEEL:

Its History, Manufacture, Properties, and Uses.

By J. S. JEANS,  
Secretary of the Iron and Steel Institute.

Section I. History of Steel: Chap. 1. History of Steel; 2. Early History in England; 3. Progress of Invention; 4. History of Bessemer Process; 5. Siemens-Martin Process; 6. Other Steel-making Processes; 7. Steel in America; 8. Germany; 9. France; 10. Austria; 11. Russia; 12. Sweden; 13. Other Countries.—Section II. Manufacture of Steel: Chap. 14. Cementation and other



# Trade Report.

Office of The Iron Age,  
Wednesday Evening, November 17, 1880.

The past week has been one of moderate activity in financial circles. The money market shows a tendency to greater firmness, and the ruling rate on call loans has been 4 @ 5%, and in some cases 6% and 1-32 per day. In some other exceptional cases it has been loaned as low as 2%.

The importations of specie and bullion at this port during the past week were \$2,107,197, consisting of \$1,337,872 gold and \$769,325 silver, as against a total of \$3,248,952 for the corresponding week of last year. The importations since the 1st of January and since the 1st of August compare as follows with the movements during the corresponding periods last year:

|             | Since January 1, 1880. | 1879.       | 1880.       |
|-------------|------------------------|-------------|-------------|
| Gold.....   | \$1,337,872            | \$1,337,872 | \$1,337,872 |
| Silver..... | \$769,325              | \$769,325   | \$769,325   |
| Total.....  | \$2,107,197            | \$2,107,197 | \$2,107,197 |

Government bonds have been strong, and the 4s and 4½s advanced to the highest quotations yet reached for these issues. They improved ½ @ 1%. Other first-class investment securities were also strong. Below we give the closing quotations of government bonds.

The stock market was alternately strong and weak for speculative shares, with frequent and wide fluctuations. The principal dealings have been in Erie, Reading, New Jersey Central, Delaware, Lackawanna and Western, Kansas and Texas, Wabash and Western Union. Below we give the closing quotations of shares in the active list.

The National Bank averages compare as follows for the past two weeks:

|                        | Nov. 6.      | Nov. 13.     | Comparison.    |
|------------------------|--------------|--------------|----------------|
| Loans.....             | \$34,370,000 | \$34,970,000 | Inc. \$600,000 |
| Specie.....            | 66,001,700   | 64,935,400   | Dec. 1,066,300 |
| Legal tenders.....     | 11,039,800   | 11,474,000   | Inc. 434,200   |
| Reserve.....           | 75,681,800   | 74,430,000   | Dec. 1,251,800 |
| Deposits.....          | 307,766,000  | 307,766,000  | Dec. 0         |
| Reserve re-quired..... | 75,681,800   | 75,681,800   | Dec. 0         |
| Surplus.....           | 18,691,800   | 18,708,700   | Inc. 16,900    |
| Circulation.....       | 18,691,800   | 18,708,700   | Inc. 16,900    |

The foreign trade movements for the week are shown in the following tables:

For the week ended November 13:

|                     | 1878.       | 1879.       | 1880.       |
|---------------------|-------------|-------------|-------------|
| Total for week..... | \$5,079,896 | \$6,497,541 | \$6,444,059 |
| Prev. reported..... | 243,787,545 | 274,799,757 | 413,924,653 |

Since Jan. 1.....\$41,867,381 \$43,124,292 \$42,611,227

Included in the imports of general merchandise for the week were articles valued as follows:

|                         | Quantity. | Value.  |
|-------------------------|-----------|---------|
| Animals.....            | 301       | \$2,725 |
| Brass goods.....        | 30        | 2,729   |
| Bronzes.....            | 30        | 2,729   |
| Chains and anchors..... | 20        | 2,420   |
| Copper.....             | 375       | 3,750   |
| Cutlery.....            | 123       | 3,019   |
| Flax.....               | 3         | 3       |
| Gas fixtures.....       | 1         | 344     |
| Guns.....               | 44        | 11,252  |
| Hardware.....           | 23        | 377     |
| Iron, hoop, tons.....   | 1,258     | 40,388  |
| Iron, sheet, tons.....  | 145       | 22,385  |
| Iron ore, tons.....     | 6,347     | 21,804  |
| Iron, other, tons.....  | 1,191     | 3,860   |
| Lead, pigs.....         | 27        | 27      |
| Nails.....              | 47        | 598     |
| Needles.....            | 17        | 8,008   |
| Old metal.....          | 1         | 2,488   |
| Platina.....            | 1         | 3,353   |
| Plated ware.....        | 1         | 675     |
| Perforation caps.....   | 41        | 4,049   |
| Saddlery.....           | 7,810     | 58,563  |
| Steel.....              | 6         | 439     |
| Silverware.....         | 26,703    | 114,654 |
| Tin, boxes.....         | 24,670    | 62,794  |
| Tin, 255 slabs.....     | 22        | 4,670   |
| Wire.....               | 272,074   | 17,512  |
| Zinc.....               | 17,512    | 17,512  |

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended November 16:

|                     | 1878.       | 1879.       | 1880.       |
|---------------------|-------------|-------------|-------------|
| For the week.....   | \$6,301,896 | \$6,810,600 | \$6,084,388 |
| Prev. reported..... | 294,625,474 | 295,228,957 | 282,291,883 |

Since Jan. 1.....\$201,017,370 \$203,004,457 \$205,376,271

EXPORTS OF SPECIE.

For week ended November 13:

|  | Total for the week..... | Previously reported..... |
|--|-------------------------|--------------------------|
|  | \$14,284                | 6,728,246                |

Total since January 1, 1880.....\$7,973,030

Same time in 1878.....11,462,366

Same time in 1877.....44,197,383

Same time in 1876.....49,062,080

Same time in 1875.....48,391,829

Same time in 1874.....46,794,824

Same time in 1873.....45,628,905

Same time in 1872.....66,638,905

The closing quotations for United States bonds were as follows:

|                                | Bid.    | Asked.  |
|--------------------------------|---------|---------|
| U. S. 4's 1880 registered..... | 102 1/4 | 102 3/4 |
| U. S. 4's 1880 coupon.....     | 102 1/4 | 102 3/4 |
| U. S. 4's 1881 registered..... | 102 1/4 | 102 3/4 |
| U. S. 4's 1881 coupon.....     | 102 1/4 | 102 3/4 |
| U. S. 4's 1882 registered..... | 102 1/4 | 102 3/4 |
| U. S. 4's 1882 coupon.....     | 102 1/4 | 102 3/4 |
| U. S. 4's 1883 registered..... | 102 1/4 | 102 3/4 |
| U. S. 4's 1883 coupon.....     | 102 1/4 | 102 3/4 |
| U. S. 4's 1884 registered..... | 102 1/4 | 102 3/4 |
| U. S. 4's 1884 coupon.....     | 102 1/4 | 102 3/4 |
| U. S. 4's 1885 registered..... | 102 1/4 | 102 3/4 |
| U. S. 4's 1885 coupon.....     | 102 1/4 | 102 3/4 |
| U. S. 4's 1886 registered..... | 102 1/4 | 102 3/4 |
| U. S. 4's 1886 coupon.....     | 102 1/4 | 102 3/4 |
| U. S. 4's 1887 registered..... | 102 1/4 | 102 3/4 |
| U. S. 4's 1887 coupon.....     | 102 1/4 | 102 3/4 |
| U. S. 4's 1888 registered..... | 102 1/4 | 102 3/4 |
| U. S. 4's 1888 coupon.....     | 102 1/4 | 102 3/4 |
| U. S. 4's 1889 registered..... | 102 1/4 | 102 3/4 |
| U. S. 4's 1889 coupon.....     | 102 1/4 | 102 3/4 |

The following were the closing quotations of active shares:

|   | Bid.   | Asked.  |
|---|--------|---------|
| American District Telegraph.....        | 75     | 75 1/2  |
| Atlantic and Pacific Telegraph.....     | 40     | 40 1/2  |
| Alton and Terre Haute.....              | 35     | 35 1/2  |
| Am. Union Telegraph.....                | 105    | 105 1/2 |
| Burlington and Quincy.....              | 16 1/2 | 16 3/4  |
| Central Pacific.....                    | 85     | 85 1/2  |
| C. & C. I. C.....                       | 20 1/2 | 20 3/4  |
| Chicago, St. Louis and New Orleans..... | 38     | 38 1/2  |
| Ohio Central.....                       | 25 1/2 | 25 3/4  |
| Chicago and Alton.....                  | 25 1/2 | 25 3/4  |
| Chesapeake and Ohio.....                | 19 1/2 | 19 3/4  |
| Clev., Col., Cin. and Indianapolis..... | 20 1/2 | 20 3/4  |
| Climax.....                             | 80     | 80 1/2  |

|                                       |         |         |
|---------------------------------------|---------|---------|
| Central Arizona.....                  | 8 1/2   | 9       |
| Caribou.....                          | 2 1/2   | 2 3/4   |
| Canada Southern.....                  | 6 1/2   | 6 3/4   |
| Colorado Coal and Iron.....           | 25      | 25 1/2  |
| Denver and Rio Grande.....            | 70 1/2  | 70 3/4  |
| Delaware, Lack and Western.....       | 58 1/2  | 58 3/4  |
| Delaware & Hudson Canal.....          | 88      | 88 1/2  |
| Erie and Western.....                 | 31 1/2  | 31 3/4  |
| Excelsior Mining.....                 | 7       | 7 1/2   |
| Express-Adams.....                    | 119     | 120     |
| Wells, Fargo.....                     | 111     | 112     |
| American.....                         | 65 1/2  | 65 3/4  |
| United States.....                    | 51 1/2  | 51 3/4  |
| Homestake.....                        | 42 1/2  | 42 3/4  |
| Hannibal and St. Joseph.....          | 40 1/2  | 40 3/4  |
| Houston and Texas.....                | 40 1/2  | 40 3/4  |
| Iron Mountain.....                    | 18 1/2  | 18 3/4  |
| Illinois Central.....                 | 118 1/2 | 118 3/4 |
| Kansas and Texas.....                 | 40 1/2  | 40 3/4  |
| Keokuk and Des Moines.....            | 20 1/2  | 20 3/4  |
| Louisville and Nashville.....         | 85      | 85 1/2  |
| Lake Shore.....                       | 113 1/2 | 113 3/4 |
| Little Pittsburgh.....                | 4 1/2   | 4 3/4   |
| Metropolitan Elevated.....            | 110     | 110 1/2 |
| Mont. Gas.....                        | 31 1/2  | 31 3/4  |
| Morris and Essex.....                 | 115 1/2 | 115 3/4 |
| Michigan Central.....                 | 108 1/2 | 108 3/4 |
| Metropolitan Elevated.....            | 30      | 30 1/2  |
| Marietta and Cincinnati Pref.....     | 4       | 4 1/2   |
| Mobile and Ohio.....                  | 21 1/2  | 21 3/4  |
| Northern Pacific.....                 | 31 1/2  | 31 3/4  |
| New Central Coal.....                 | 56 1/2  | 56 3/4  |
| Nashville and Chattanooga.....        | 67 1/2  | 67 3/4  |
| New York Central.....                 | 136 1/2 | 136 3/4 |
| New York Elevated.....                | 113 1/2 | 113 3/4 |
| Northwest.....                        | 138 1/2 | 138 3/4 |
| New Jersey Central.....               | 70 1/2  | 70 3/4  |
| Omaha.....                            | 43 1/2  | 43 3/4  |
| Ontario and Western.....              | 27 1/2  | 27 3/4  |
| Oregon Silver.....                    | 31      | 31 1/2  |
| Oregon Navigation.....                | 121 1/2 | 121 3/4 |
| Pac. Dec. and Evans.....              | 35 1/2  | 35 3/4  |
| Panama.....                           | 204     | 204 1/2 |
| Pittsburgh, Titusville & Buffalo..... | 33      | 33 1/2  |
| Quicksilver.....                      | 7       | 7 1/2   |
| Reading.....                          | 41 1/2  | 41 3/4  |
| Rock Island.....                      | 121 1/2 | 121 3/4 |
| St. Paul.....                         | 117 1/2 | 117 3/4 |
| St. Paul Pref.....                    | 50 1/2  | 50 3/4  |
| San Francisco Pref.....               | 80      | 80 1/2  |
| San Francisco 1st Pref.....           | 80      | 80 1/2  |
| Texas Pacific.....                    | 30 1/2  | 30 3/4  |
| Union Pacific.....                    | 94 1/2  | 94 3/4  |
| Western Union Telegraph.....          | 95 1/2  | 95 3/4  |
| Wabash.....                           | 42 1/2  | 42 3/4  |
| Wabash Pref.....                      | 70 1/2  | 70 3/4  |

MINING STOCKS.

The following were the closing quotations of the New York Mining Stock Exchange:

|                            | Bid.  | Asked. |
|----------------------------|-------|--------|
| Amie.....                  | 40    | 41     |
| American Flag.....         | 34    | 35     |
| Bel. Isle.....             | 60    | 61     |
| Buckeye.....               | 18    | 19     |
| Bull. Dom.....             | 5     | 6      |
| Bodie.....                 | 3     | 4      |
| Calaveras.....             | 30    | 31     |
| California.....            | 175   | 176    |
| Climax.....                | 2     | 3      |
| Consolidated Virginia..... | 2     | 3      |
| Chrysolite.....            | 5 1/2 | 5 3/4  |
| Dahlonega.....             | 10    | 11     |
| Durango.....               | 10    | 11     |
| Eureka.....                | 17    | 18     |
| Great Eastern.....         | 35    | 36     |
| Gold Placer.....           | 70    | 71     |
| Goodshaw.....              | 70    | 71     |
| Green Mountain.....        | 4     | 5      |
| Hickell.....               | 170   | 171    |
| Lacrosse.....              | 30    | 31     |
| Leadville.....             | 41    | 42     |
| L. Chief.....              | 1     | 2      |
| Moore.....                 | 85    | 86     |
| Maybelle.....              | 15    | 16     |
| Red Elephant.....          | 25    | 26     |
| Rappah.....                | 21    | 22     |
| S. B. die.....             | 1     | 2      |
| S. Hite.....               | 50    | 51     |
| S. Bulwer.....             | 45    | 46     |
| Silver Cliff.....          | 200   | 201    |
| Shuro.....                 | 2     | 3      |
| Unadilla.....              | 19    | 20     |

GENERAL HARDWARE.

Although manufacturers in many lines of hardware find that the demand has tapered off a good deal, the jobbing houses continue to be actively engaged, and the amount of goods going into consumption is unusually large considering the lateness of the season. With regard to values there are few changes to announce, and it is not probable that much revision of prices will be made before the commencement of the new year.

The manufacturers of Brass Sliding Door Rail have formed a combination, and a uniform discount of 20 per cent. from the list is announced.

The Atlantic States Nail Manufacturers' Association held a meeting in this city today. No action regarding prices was taken. The demand for these goods is fair, but the tone of the market is weak and prices are irregular. We quote rod., in large lots, \$2.75 net, and for small parcels, \$2.80 @ \$2.90 represents holders' views.

The Ax Manufacturers, at their meeting last week, confirmed existing prices.

We have received the following circular:

NORTH EASTON, Nov. 10, 1880.

GENTLEMEN: We have reduced the prices of the following goods on our price list of July 1, 1879:

|                      |                     |
|----------------------|---------------------|
| Nos. 112 to 194..... | 50 cents per dozen. |
| Nos. 258 to 708..... | 50 cents per dozen. |
| Nos. 730 to 752..... | 50 cents per dozen. |
| Nos. 813 to 816..... | 75 cents per dozen. |
| Nos. 838 to 865..... | 75 cents per dozen. |

On and after this date we shall allow on all of our goods a discount of 10 per cent. from list prices of July 1, 1880.

We will also allow an extra discount of 6 per cent. to all parties who net purchases from us exceed \$500 in six months.

In addition to above-named discounts, we will allow at the close of the season of January 1, 1881, a further discount of 1 per cent. on each \$1000, up to \$5000, net, of our goods purchased during said term. This extra discount not to be deducted before the expiration of the six months, and to be forfeited by all parties who have broken the following rates, viz:

Parties east of the line of Pittsburgh and Buffalo, will be required to sell goods at a discount not greater than 10 per cent. Parties in Pittsburgh, Buffalo and west of the line will be required to sell goods at a discount not greater than 7 1/2 per cent.

Our terms are net cash, payable in Boston or New York funds, we reserving the privilege of drawing at sight, with exchange, for all bills not paid within 15 days. Interest

from date, at 7 per cent., will be charged on all invoices not paid promptly. We prepay the freight on our goods to Boston or New York, but all goods are at risk of purchaser after shipment from the factory. All orders will be filled at the prices ruling at the date of shipment. Yours respectfully,

OLIVER AMES & SONS CORPORATION.

The Old Colony Iron Company have made corresponding reductions in list prices of their Shovels, &c., but their circular has not yet been received.

In foreign Hardware there are no changes in values to note; business is not quite as active as recently reported, but for fine goods suited to the requirements of the approaching holidays the demand is satisfactory.

## BRITISH IRON MARKET.

[Special Report by Cable to The Iron Age.]

LONDON, Wednesday, November 17, 1880.

Scotch Pig.—The market is active and demand improving, with firmer prices. Since last week quotations have been advanced 6d. on Glengarnock, 1/ on Coltness and 1/6 on Gartsherrie and Eglinton. The following are makers' prices:

|                  |      |
|------------------|------|
| Gartsherrie..... | 64/6 |
| Coltness.....    | 64/6 |
| Glengarnock..... | 58/  |
| Eglinton.....    | 54/  |

Manufactured Iron.—The market is quiet and prices steady, with a fair business doing. Best Staffordshire Bars remain at £7/10/.

Steel Rails.—Prices are firmer under a steady demand. Ordinary sections are quoted £6 @ £6 5/.

Iron Rails.—The improved demand still continues, and prices are steady. Welsh are quoted £5 @ £5 5/.

Old Rails.—Prices are firmer, with fair sales. Offerings are moderate. Old Ts are quoted £3/17/6.

Scrap.—No change. We quote Wrought £3/5/.

## IRON.

American Pig.—There is a fair inquiry for Pig Iron this week, and prices are well maintained; at the same time there is not that vim to the business that the sanguine ones in the trade had anticipated. In small parcels considerable Iron has gone into consumption during the week, but no transaction worthy of special mention has come to our notice. We quote Foundry No. 1, \$25 @ \$26; Foundry No. 2, \$21, and Gray Forge, \$20.

Scotch Pig.—The tone of the market is listless, although considerable Iron has changed hands during the week. Sales are reported of 400 tons Gartsherrie at \$23.50; 100 tons Coltness and 600 tons Eglinton on private terms. We also hear of a sale of 5000 tons Middlesboro' Iron, from bankers' hands to a dealer, on terms which have not transpired. We quote: Eglinton, \$21.50 @ \$22; Coltness, \$24.50 @ \$25; Glengarnock and Gartsherrie, \$23.50 @ \$24, and Gartsherrie, \$23.50.

Rails.—Nothing new in Steel Rails is announced in this market, but in Iron Rails considerable business is said to have transpired, though particulars are withheld. We quote: Iron, \$46 @ \$49; and Steel Rails, \$59 @ \$63.

Old Rails.—The demand for Old Rails continues fair, and sales are reported of 7000 tons Ts on private terms, and 500 tons D. H. ex ship, at \$27. We quote the market at the close of business to-day, \$26.50 @ \$27.50, for Ts and D. H. respectively.

Scrap.—Sales are reported aggregating 1100 tons Wrought Scrap, on private terms. We quote No. 1 Wrought, from yard, \$26 @ \$27.

## METALS.

Copper.—Little or no change has occurred since our last report, absolutely nothing having transpired in the way of transactions, although there have been rumors of sales at figures below the nominally ruling ones of 18 1/2¢ @ 19¢ for Lake Superior, and 18 1/4¢ for Baltimore. We cannot trace these rumored sales to any authoritative source, the companies being firm in their demand of 19¢, and it is besides urged in their favor that after having held for so long a time at ruling prices they cannot be expected to give way at this juncture, when the lots in the hands of outside parties and speculators have been absorbed. London quotes, per cable, Chili Bars, 26 1/2, 10/7, and Best Selected, 26 1/2, 10/7. The latest English mail advices are under date of November 6, as follows: "This market on the whole has been quiet, but tolerably cheerful in tone, and prices have slightly advanced. Much of the firmness which has been experienced this week has been occasioned from the light charters from Chili for the last half of October, which are announced as only 700 tons, and operators thinking that as there has been such a limited business doing for so long past, buyers may again come forward and prices be thus advanced; but be this as it may, it is evident that there is no very great inducement to effect purchases at the present time, for the public stock is not only heavy, but by the last statistics is seen to have further increased, the total visible stock on the 1st inst. being 62,543 tons, against 60,967 tons. The statistics of Chilean and Bolivian produce in first and second hands in Liverpool and Swansea, however, are rather more satisfactory, since they show a slight decrease in the stock, the quantity on October 30 being 32,547 tons, against 33,032 tons on the 15th ult. The imports during the latter half of October were light, being only 547, against 1695 tons for the same time last year; but the deliveries do not compare well, as they are only 1032 tons, against 2170 tons. With a succession of light charters from Chili, prices will probably advance, but without which there

does not appear anything to justify a rise at the present time." Manufacturers remain as under: Bottoms, 31¢; Braziers, according to size, 28¢ @ 34¢; Circles, 31¢ @ 34¢; Segment Sheets, 31¢; Fire-box Sheets, 28¢; Sheathing, 26¢; and Bolt Copper, 28¢.

Tin.—Our market has developed considerable strength, and a large business has been done, some 500 tons, at advancing prices, the purchases being made, it is claimed, on the part of consumers. London cables Straits \$90. 10/ firm, while the Singapore quotation is £93. 10/ cost and freight by steam, or fully 21¢ laid down here. Shipments for the first half of November from the Straits settlements to the United States have been 400 tons. We quote at the close, large lines, Straits, 20 1/2¢ @ 21 1/4¢; Australian, 20 1/2¢ @ 21¢, and Billiton, 20 3/8¢ @ 20 1/2¢. At the close the market is strong, with an upward tendency. From London they write, under date of November 6, as



|                     |      |      |
|---------------------|------|------|
| Hdw. cs. ....       | 415  | 6.08 |
| Tinware, cs. ....   | 23   | 6.03 |
| Machinery, cs. .... | 60   | 3.87 |
| Railroad cars, 70   | 3.80 |      |
| Nails, kegs, 131    | 480  |      |
| Tacks, cs. ....     | 40   | 2.65 |
| Nails, bxs. ....    | 5    | 37   |
| Clocks, cs. ....    | 98   | 2.30 |
| Pld ware, cs. ....  | 22   | 1.97 |
| Glassware, cs. .... | 135  | 1.18 |
| Tins, cs. ....      | 3    | 86   |
| Sew. ma. ....       | 25   | 8.44 |
| Watches, case 1     | 300  |      |
| Pg. mtl. pgs. ....  | 11   | 477  |
| Pumps, pgs. ....    | 14   | 834  |
| Cgo. mtl. pgs. .... | 7    | 600  |

## Fenestella.

|                      |       |       |
|----------------------|-------|-------|
| Ptlin. gals. ....    | 9,000 | 1.360 |
| Glassware, pgs. .... | 11    | 154   |
| Lamps, pgs. ....     | 5     | 213   |
| Carta, pgs. ....     | 25    | 240   |
| Mach'y, cs. ....     | 3     | 308   |
| Cutlery, cs. ....    | 3     | 308   |
| Pg. mtl. pgs. ....   | 11    | 477   |
| Hdw. pgs. ....       | 20    | 808   |
| Mf. iron, pgs. ....  | 1     | 120   |
| Iron safe, ....      | 1     | 120   |
| Nails, kegs, ....    | 53    | 271   |
| Ag. imp. pgs. ....   | 6     | 193   |
| Sew. ma. ....        | 1     | 27    |
| Nails, bxs. ....     | 7     | 8     |

## Hayth.

|                     |     |       |
|---------------------|-----|-------|
| Hose, cs. ....      | 850 |       |
| Copper, csks. ....  | 5   | 975   |
| Tinware, pgs. ....  | 18  | 70    |
| Mf. iron, pgs. .... | 57  | 209   |
| Cutlery, case, 1    | 300 |       |
| Pile driver, ....   | 1   | 309   |
| Hdw. cs. ....       | 68  | 1,638 |
| Glassware, cs. .... | 24  | 315   |
| Pldware, bxs. ....  | 4   | 104   |
| Iron, pgs. ....     | 260 | 453   |
| Coal, hds. ....     | 15  | 78    |
| Wheels, pr. ....    | 18  | 200   |
| Nails, kegs, ....   | 25  | 45    |

## Central America.

|                    |    |     |
|--------------------|----|-----|
| Ag. imp. pgs. .... | 12 | 149 |
|--------------------|----|-----|

## IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending November 15, 1880:

|                         |                          |
|-------------------------|--------------------------|
| <b>Hardware.</b>        | Mason J. W.              |
| Alexander F. & Sons,    | Wire rope, coll. 1       |
| Files, case, 1          | Pterson & Co.            |
| Cutlery, cs. 2          | Whitney A. R. & Co.      |
| Baker Hermann & Co.     | Tubes, 50                |
| Cases, 25               | Williamson J. & Co.      |
| Cases, 4                | Pig, tons, 300           |
| <b>Carry S.</b>         | Order                    |
| Millstones, csks. 25    | Ore, tons, 1232          |
| Curley & Bro.           | Ore, kilos, 26,500       |
| Cutlery, case, 1        | Spiegel, tons, 235       |
| Folsom H. & D.          | Spiegel, kilos, 203      |
| Cases, 4                | 057                      |
| Field A. & Co.          | Scrap, rails, pieces,    |
| Cases, 5                | 21,300                   |
| Chairs, csks. 5         | Scrap, fish plates,      |
| Per. caps, cs. 4        | 21,300                   |
| Howard Bros. & Head,    | Scrap, tires, 13         |
| Cases, 8                | Scrap, csks. 31          |
| Hartley & Graham,       | Pig, tons, 177           |
| Arms, cs. 10            | Scrap, pgs. 314          |
| Junge J. W.             | Scrap, tons, 533         |
| Arms, case, 1           | Rods, bds., 1892         |
| Lippincott J. B.        | Bars, 10,477             |
| Cases, 2                | Mach'y, pgs., 3          |
| Lent & Braman,          | Cotton ties, bds.,       |
| Case, 1                 | 2340                     |
| Livingston W. & F.      | <b>Steel.</b>            |
| Millstones, 1235        | Brown W.                 |
| Grindstones, 12         | Bundles, 211             |
| Merchants' Dis. Co.     | Bars, 6                  |
| Guns, cs. 3             | Brown Bros. & Co.        |
| Moore & J. F. Sons,     | Package, 137             |
| Mide., 1                | Lee & Co.                |
| Moseman C. M. & Bros.   | Blooms, 265              |
| Cases, 2                | Moore Henry,             |
| Files, csks. 4          | Cases, 2                 |
| Seymour W. N. & Co.     | Moss F. W.               |
| Cutlery, csks. 3        | Bundles, 59              |
| Scovill Mfg. Co.        | Bars, 4                  |
| Mide., pgs., 1          | Temple & Lockwood,       |
| Schuyler & Graham,      | Bars, 40                 |
| Guns, case, 1           | Bundles, 72              |
| Whyte Alex.             | Woodford W. O.           |
| Case, 1                 | Bundles, 312             |
| Wetzlar M.              | Bars, 34                 |
| Mide., pgs., 1          | Order                    |
| Wiebisch & Hilger       | Scrap steel, kilos,      |
| Hdw. Co.                | 40,000                   |
| Cutlery and hdw.,       | Scrap springs, lot, 1    |
| pgs., 13                | Scrap springs, tons,     |
| Order                   | 40,000                   |
| Arms, cs. 49            | Cases, 8                 |
| Whetstones, csks. 10    | Cases, 105               |
| Cases, 9                | <b>Metals.</b>           |
| Casks, 3                | Baring Bros. & Co.       |
| <b>Iron.</b>            | Tin, slabs, 1065         |
| Bank of N. Y.           | Brown Bros. & Co.        |
| Hoops, bds., 2009       | Tin, slabs, 1272         |
| Baring Bros.            | Dickerson, Van Duzen     |
| Wire, bds., 170         | & Co.                    |
| Wire, plates, 100       | Antimony, csks. 14       |
| Pig, tons, 100          | Merchants' Bank of Cana- |
| Bank of San Francisco,  | dis.                     |
| Pig, tons, 245          | Tin plates, bxs., 1766   |
| Brown Bros. & Co.       | Taggers, bxs., 18        |
| Ore, tons, 1550         | Phelps, Dodge & Co.      |
| Gal. wire, csks., 39    | Tin plates, bxs., 267    |
| Bloomfield J. C. & Son, | Winter, de Visser & Co.  |
| Machinery, pgs., 16     | Tin, slabs, 535          |
| Drexel, Morgan & Co.    | Waydell & Co.            |
| Ore, tons, 192          | Scrap copper, csks. 1    |
| Henderson Bros. & Co.   | Order                    |
| Pig, tons, 150          | Scrap copper, bbls.,     |
| Irwin Richard & Co.     | 16                       |
| Pig, tons, 500          | Scrap copper, pgs., 4    |
|                         | Scrap cop'r, bds., 3     |
|                         | Tin plates, bxs., 939    |

## PHILADELPHIA.

Office of The Iron Age, 250 South Fourth St., Philadelphia, Nov. 15, 1880.

**Pig Iron.**—The market shows very little change—demand fair, prices steady and firm. The chief interest at present is in finished iron, which is lower in proportion than the crude article. There are no indications whatever of weakening in Pig Metal, and consumers appear satisfied with prices now current. The volume of business during the week has been large, but at somewhat irregular prices. Two or three large lots, amounting to nearly 8000 tons in all, were taken at prices below the general market, but considering all the circumstances these sales are considered very satisfactory. Brands of iron not much known, coming on the market in lots of 2000 tons each and upward, are not easily disposed of at any time, and the fact of their being placed so near the market rate, shows much confidence in values. During the past three or four weeks a great many of what may be called outside lots have been picked up, which has had the effect of relieving the pressure on the more prominent furnaces. In fact, it is quite probable that, without these and some sales of foreign stock, prices would have been pushed upward, as it is evident the large and increasing consumption cannot be met as formerly by a few leading companies. The tone of the market, therefore, is steady and firm, and at the same time without any tendency toward speculation. Sales reported during the week have been at about the following rates: No. 1 Foundry, in the ordinary way of business, \$25 @ \$26 for best brands, and in one case \$26.50 has been realized for a very desirable make, and \$27 is now asked for more. Comparatively

new brands have been sold below \$25, and in one instance a 2000-ton lot changed hands at less than \$24—rumor says at \$23. These are the extremes of the market, however, and in the one case represents a transaction to realize cash, and in the other small lots of a particular brand in the ordinary course of business. No. 2 Foundry is comparatively quiet, and sells at \$21.50 @ \$22.50, according to brand. Gray Forge Iron has been heavily sold, and prices are very steady. One lot of 2000 tons sold at \$19.50, and same figure bid for more. Others and better known brands sold at \$20 up to \$21, and stocks are considerably reduced. White and Mottled Irons are quite scarce, the market having been pretty well cleared at \$17.50 @ \$18, and \$18.50 @ \$19. A 500-ton lot of English Iron was taken at about \$18.50, and Scotch Iron in small lots at \$22 for Eglington and \$25 for Gartsherrie. Charcoal Iron is irregular, and varies from \$33 @ \$36 for Warm Blast, and \$35 @ \$40 for Cold Blast.

**Blooms.**—Are dull and prices very irregular. Some makes are held at the extreme quotations, and are said to sell at the full quotation, too, but in the majority of cases sellers are quite willing to accept the inside figure, and even less to a good buyer. Nominal rates are as before: Cold-Blast Charcoal Blooms, \$67.50 @ \$70 per ton of 2464 lbs.; Run-out Anthracite, \$57.50; Sunken Scrap Blooms, \$52.50 per ton of 2240 lbs.; and Northern Ore Blooms, \$48 @ \$50.

**Muck Bars.**—We have not heard of any transactions within the past three or four days, but \$38 @ \$38.50 at mill is the asking price, and it is not likely that good bars could be had on better terms than these.

**Structural Iron.**—The activity noted in our last report has been fully confirmed, and the mills are now supplied with a large amount of work. Contracts for the construction of nine large iron boats for the New York Bay passenger trade, and four 2500-ton iron steamships, for the coasting trade, have been made public during the week, and is an important addition to work in the Delaware ship-building yards. Bridge building is also in a healthy condition, and the outlook is in all respects of a satisfactory character. Prices are steady, and there is little chance of orders being placed, unless at full quotations. For ordinary sized lots, Angles are firm at 2 6/8 @ 2 7/8, Beams at 3 1/2, Channels and Tees, 3 1/2.

**Plate and Tank Iron.**—The movement in shapes has to some extent been felt at the Plate Mills also, and the mills are well supplied with orders. Prices have not been helped very much, however, and the heaviest transactions have been at inside rates, one lot of 200 tons of Tank Iron having been taken at 2 7/8. Prospects for an active business are satisfactory, and prices ought to strengthen a little, but so far the trade has failed to realize it. The market may be quoted active at about the following rates, viz.: Tank and Common Plate, 2 7/8 @ 2 8/8; C. No. 1, 3 3/8; C. H. No. 1, 3 5/8; Flange Iron, 4 1/8 @ 5 1/8; Fire Box, 5 1/4 @ 6 1/8.

**Sheet Iron.**—Stocks begin to accumulate in manufacturers' hands, and buyers would probably obtain liberal concessions by taking good-sized lots. Small lots are about same as last quoted, and not likely to change for the present. Some experienced men predict a very active movement as soon as winter sets in, but in the meantime business is dull at the following rates for small lots, viz.: Common Sheet, No. 26 to 28, 4 1/2 @ 4 3/4; Common Sheet, No. 28 to 30, 4 3/4 @ 4 1/2; Best Sheet, 4 1/2 @ 4 3/4 advance on the above; Best Bloom Sheets, No. 26 to 28, 2 1/2 @ 2 3/4; Best Bloom Sheets, No. 28 to 30, 2 3/4 @ 2 1/2; Best Bloom Sheets, No. 30 to 32, 3 1/4 @ 3 1/2; Blue Annealed, 1 1/2 @ 1 3/4; Best Bloom Galvanized, discount, 10-15%; Second quality, discount, 10-15%.

**Bar Iron.**—There is nothing of importance in this branch of the Iron trade, and last week's report would fairly represent the market at this date. Business is moderately active, and prospects for a steady and heavy demand are all that can be desired, but prices are most unsatisfactory. It is difficult to account for this condition of affairs; 2 1/2 ought to be the very inside rate with present rate of cost, but it is well known that very little business has been done at that figure for some weeks past. If the demand were falling off, some shading in prices might be understood; but with the cost of production increasing and a demand sufficient to keep all the mills employed, the present unremunerative rates are inexplicable. Sales during the week have been of the usual character, no specially large lots having changed hands for some time past. One 400-ton order was taken at a very low price, but it is said that the Bars are to be made from Old Rails. Refined Iron is quoted at 2 1/4.

**Steel Rails.**—Some heavy contracts have been closed during the week, sales during the past 10 days aggregating upward of 50,000 tons, about half the amount being for the Northern Pacific Railway. Prices cannot be given definitely, but it is safe to say that \$57.50 @ \$60, at mill, according to time of delivery, covers the greater portion of the transaction. A sale of 5000 tons is also reported at \$61, delivered at a port on Lake Erie, and other sales of lots of a few hundred up to 1000 tons each, for early delivery, at still higher prices. There seems to be more disposition to enter orders than there has been, nearly all the mills having increased their capacity, or are about increasing it at an early date. There is, therefore, a disposition to keep all the business at home that is possible. Consumption is likely to be very large during the coming year, but the home production will probably be equal to the demand.

**Iron Rails.**—The past week has been rather quiet, and the only sale reported is one of 5000 tons to the Northern Pacific Railway. There has been less inquiry than usual, but as the mills are full of work, it makes no apparent difference, and as there is every reason to expect a heavy demand for spring delivery, prices are held very firm: Light Rails, 3 1/2 @ 16 1/2, are quoted \$48.50 @ \$52.50, and 5 1/2 @ \$46.50 @ \$47.

**Railway Supplies.**—As usual at this season, business is rather quiet, but in anticipation of a heavy demand in the spring, prices

are held very firm: Spikes, 2.65 @ 2.75; Fish Plates, 2.50; Track Bolts, 3.75 @ 4.50, according to specification.

**Old Rails.**—The market is difficult to quote, views of buyers and sellers being wide apart. Sales have been chiefly in lots of 200 to 400 tons each, and prices realized \$26.50 to \$27 for Flanges, and \$28 for Doubles. Buyers would find it a difficult task to duplicate purchases at these figures, as stocks are greatly reduced, and holders appear to expect much higher prices toward spring. At the same time it must be said that buyers are exceedingly cautious and under pressure to sell large lots (which is very improbable), prices would yield very easily.

**Scrap Iron.**—The market is active, and with light stocks prices are a shade higher than last week. Qualities vary considerably, and prices have to be made accordingly: the extreme of the market for Wrought Scrap may be given as \$26 to \$30. A 600-ton lot of medium quality was sold to-day at \$26.50 in store, and several hundred tons of a choice selection at \$30 in yard. Cast sells at \$19 @ \$20, and Stove Plate at about \$16.

## PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., Nov. 16, 1880.

While general business is keeping up well, better than ordinarily at this season, orders for some of the leading articles of Pittsburgh manufacture are dropping off; among others we might mention Nails and Window Glass, and it is probable there will be a comparative lull until after stock-taking, which takes place in the early part of January. The outlook is very encouraging, and our manufacturers generally are in good spirits, although there is a very general complaint that margins for profit are small, and this is particularly the case in regard to Iron, the raw article and products as well. Furnace-men generally complain that they can make no money at ruling prices, while consumers allege that the raw article is higher, relatively, than the products. The great trouble, we apprehend, lies in an active competition, caused by overproduction, and while this continues there will of necessity be more or less cutting of prices.

**Pig Iron.**—The situation remains in much the same condition noted in our report of last week. There is a considerable inquiry and a very fair business, with a firmer feeling being developed on the part of producers, some of whom are confident of being able to obtain better prices in the near future; but consumers generally aver that they are not justified in paying present rates, and consequently will not look at a sample where an advance is asked. About the only way out of this unsatisfactory condition of the iron business, is for the consumers of the raw article to demand a higher price for their product, and this will not doubt be done. If the price of Pig Iron was reduced the product would in all probability be reduced correspondingly, in which event the consumer would not be benefited, while the producer of the former would be obliged to blow out, as there is no chance for the present to reduce the cost of production. While it is true that the production is large, as most of the furnaces throughout the West are in blast, the consumption is also large, and the accumulation in first hands is not so great as many people imagine. Most of the furnaces in blast are sold ahead. Some of them have contracts sufficient to absorb production until the close of the year. Bituminous Coal and Coke Smelted Irons may be quoted as follows: Cold-chest Forge, \$20 @ \$21.50, 4 mos.; Neutral, \$22 @ \$23; all ore Red-short, \$25 @ 27—sale of 300 tons of the latter at \$27; Foundry grades, \$23 @ \$25, for Nos. 2 and 1. Cold-blast Charcoal, \$38 @ \$40.

**Bessemer Iron.**—There has been considerable activity within the past few weeks, some large contracts having been effected, but the terms, for reasons best known to the parties interested, are withheld. Some small sales have been reported within the past few days, ranging from \$26 @ \$28, 4 mos.; it is understood that the price for the large lots to which reference has been made is somewhere about \$26. At the prices quoted, American Bessemer is from \$2 @ \$4 per ton cheaper than the foreign article, as the latter, it is said, cannot now be delivered here in Pittsburgh under \$29 @ \$30, that is, for good reliable brands. This has, no doubt, had considerable to do with the recent movements, consumers being apprehensive, in view of foreign being so much higher than native, that this might lead to an advance in the latter.

**Manufactured Iron.**—While there is no complaint to make in regard to the volume of business, as the mills generally are well employed, prices are unsatisfactory and irregular. There is considerable "cutting." The demand for bars has been light for some time past, and it is said that sales have been made by mills not very far West of Pittsburgh at 2 1/2 rates here. We hear of quotations all the way from 2.10 @ 2.25. Some firms declare most emphatically that they will, under no consideration, accept less than 2.25, but we hear of sales at 2.10 and 2.15 rates, 60 days, with the usual discount of 2% for cash. Sheet Iron is weaker, and cannot fairly be quoted above 2.65 @ 2.75 for No. 24. We hear of sales considerably below our quotations. Plate is still quotable at 2.90 @ 3 and Tank at 3.20 @ 3.25. Hoop, for which there appears to be a fair inquiry, 3 1/2 @ 3.10; Skelp Iron, 2.20 @ 2.30.

**Nails.**—While the market continues dull, as is to be expected at this season of the year, prices are quoted steady at \$2.65 @ \$2.75, 60 days, 2% off for cash. There is not likely to be much, if any, movement until the latter part of January, when ordinarily orders for the spring trade commence to come forward. It is thought that the consumption will be much larger next year than it has been for some years past.

**Wrought Iron Pipe.**—There is no abatement in the demand which set in early in the fall, and the Pipe mills, not only here, but throughout the country, are busy, and are likely to continue so until the close of the year. No change in card or discounts—60 @ 65%. Boiler Tubes remain unchanged at 40% off regular list. Oil Well

Casing and Tubing unchanged at \$21 1/2, and 90 cents per foot. There is not much doing in the latter goods, nor is it to be expected, in view of the continued depressed condition of the oil market.

**Railway Supplies.**—There is an increased demand for most goods of this kind, and prices are firmer, but not notably higher. Spikes, 2.50 @ 2.75, 30 days; Splice Bars, 2.25; Track Bolts, 3 1/2 @ with square and 4 1/2 with hexagon nuts. The indications are that there will be a very large business in old railway supplies next year; already some of the Steel Rail mills are sold up until next July.

**Steel.**—While the demand for the leading grades of Merchant is not as active, possibly, as it was some time ago, the mills still have about all they can do, and prices are steady. There is always more or less "cutting," and there is, so far as we learn, no more now than usual. The consumption of American Steel this year has been larger than ever before.

**Scrap.**—There is a fair and increasing business and prices are rather firmer, although the demand is chiefly for small lots to supply immediate actual wants. We quote as follows: No. 1 Selected Wrought Scrap, \$27 1/2 net ton; other grades, \$24 @ \$26; No. 1 Machinery Metal, \$20 @ \$21, gross; Old Car Wheels, \$32 @ \$34, gross; No. 1 Wrought Turnings, \$18 @ \$20, net; Cast Borings, \$14 @ \$16, gross; Old Car Railroad Springs, \$40 @ \$42, net; Old Railroad Axles, \$36 @ \$38, net. The above are, as near as can be ascertained, the actual selling prices by dealers to consumers.

**Window Glass.**—While there are but few new orders coming forward, some of the factories are still engaged on former contracts, and it is not likely that there will be much "piling up" done until next month. No change in card or discounts.

**Coke.**—There is a continued good demand, and notwithstanding production is large, estimated in round numbers at 30,000 tons per week, there is no accumulation, and prices are steady at \$150 per ton, delivered free on cars at ovens. Small foundry orders \$1.60 @ \$1.75.

**Coal.**—There is, as is always the case at this season of the year, an increasing demand, and prices are firm, with a tendency to go higher, owing to the increased cost of mining. If this should happen to be a hard winter and navigation suspended any length of time, Coal will rule high in the down-river markets.

**Petroleum.**—The general position of the market, both for the raw article and the product, remains much the same as noted in our last report. The price of the former has dropped still lower, and the latter, although unchanged, is sympathizing. The great trouble in this important article is overproduction, and while this is the case it is not likely that there will be any improvement in prices.

## CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts., Chattanooga, Nov. 15, 1880.

The week has been cool, with clear days, closing cold, raw and rainy. The amount of business has been a fair average. Prices tend to weaken, since our last report, for most manufactured articles, the strengthening just after the election proving but a short-lived spurt. The movement of crude Iron, Cotton and other raw materials in the South this fall has so far been largely in excess of any former similar period.

**Pig Iron.**—Business is fair in amount. Foundry grades are still scarce, No. 1 being off the market for the time, and will remain nominal until old orders in hand at furnaces are filled, which will require some weeks yet. We quote same as last report, except Car Wheel Metal, which has fallen off \$5 on No. 1 and \$2 on No. 2. No. 1 Foundry, \$25 @ \$27; No. 2 Foundry, \$23 @ \$25; Gray Forge, \$20 @ \$22; White and Mottled, \$18 @ \$20; Car Wheel Metal, \$38 @ \$40.

**Miscellaneous Articles.**—Old Rails continue in full supply. We quote them at \$22 @ \$26; Wrought Scrap, \$20 @ \$24; Cast, \$15 @ \$17; Old Wheels, \$28 @ \$30.

**Ores.**—We quote: 50% Brown Hematite, per ton, \$2 @ \$2.75; Red Fossil, \$2 @ \$2.25.

**Nails.**—Are weak at \$3.10, with usual discounts for 200-kg lots and for cash. The demand is good. The cause of the decline can only be attributed to the pressure of the holders to realize.

**Manufactured Iron.**—The necessities of Pittsburgh mills for a market at some price still holds down prices of Bar. They quote at \$2.15 @ \$2.25, and sell in round lots as low as \$2.05 @ \$2.10, 60 days. Birmingham, Ala., is meeting this cut in Nashville, Louisville and New Orleans. The unwillingness of Chattanooga masters to sell at such figures has circumscribed their trade for several weeks. We quote: Bar, weak at \$2.40 rates; Railroad Spikes, \$3; Track Bolts, \$4; Treble Bolts, \$4.50; Fish Plate, \$2.50. Bar is stiff at quotation.

**Coal.**—Coal has steadily advanced since September, and is now higher in small lots than for several years. If the old contracts, under which nearly all the Southern mills are running, expire before there is a change for the better, there will be serious embarrassment on that account, for miners will sharply advance prices as soon as they can. We quote run of mine at \$1.65 @ \$1.75, at mills; Lump, 1 1/2 @ 1 1/2, at yard.

**Coke.**—Furnace Coke, \$3 per ton at furnace; Foundry, 10¢ @ 12¢ per bushel.

**Steel and Iron Rails.**—We quote: Steel Bars at \$62.50 for American makes, \$60 for foreign. Iron, \$48 @ \$50; Small T is firm at \$55.

**Lead.**—We quote: Pig Lead, 4 1/2 @ 5¢.

**Steel.**—Flaw Slabs, 3 in. and under, \$4.70; Black Diamond, ordinary sizes, 13¢.

## CINCINNATI.

NOVEMBER 15.—Pig Iron.—It is known to consumers of both Pig and Manufactured Iron that prices during the past week—and the same obtains for to-day—were lower than they have been in the past 12 months. The offerings of Pig and Manufactured Iron to consumers extend to deliveries far into the coming year on a

basis of present quotations, and no considerable transactions are yet recorded. Statistics of the production of Pig Iron in every section of the United States are rigidly kept in Cincinnati, and the probable consumption for the coming year at all points is estimated. It is a guess, but will approximate the true condition, and our conclusion is that "supply and demand" will govern. The late elections give assurance that there will be no material change in the financial policy of the government nor in the tariff. This gives body and strength to the industries of our nation, and an outlook upon general prosperity in all branches of manufacture, and this is all that is in it now. Sales during the past week have been at the following prices:

|                                      |                 |
|--------------------------------------|-----------------|
| No. 1 Hanging Rock Charcoal Foundry  | 4 mos.          |
| No. 2 Hanging Rock Charcoal Foundry  | \$27.00 @ 27.50 |
| No. 1 Hanging Rock Coke Foundry      | 26.00 @ 26.50   |
| No. 2 Hanging Rock Coke Foundry      | 25.50 @ 26.00   |
| No. 1 Hanging Rock Stonecoal Foundry | 23.50 @ 24.00   |
| No. 2 Hanging Rock Stonecoal Foundry | 22.50 @ 23.00   |
| No. 1 Hanging Rock Stonecoal         | 22.50 @ 23.00   |
| No. 2 Hanging Rock Stonecoal         | 22.00 @ 22.50   |
| No. 3 Hanging Rock Stonecoal         | 21.50 @ 22.00   |
| Hanging Rock Charcoal Car Wheel      | 40.00 @ 42.00   |
| Iron, Nos. 1 to 5                    | 24.00 @ 24.50   |
| Hanging Rock Charcoal Mill Iron      | 21.50 @ 22.00   |
| Coke                                 | 20.50 @ 21.00   |
| Southern Coke Mills                  | 20.50 @ 21.00   |

## BOSTON.

NOVEMBER 6.—Holders of raw Iron are now very firm and we note a fair demand, though with very little tendency toward any further advance. The amount of business done since our last has not been as great as many anticipated and there is no speculation. We quote American Pig Iron at \$25 @ \$26 for No. 1 X; \$20 @ \$22 for No. 2 X, and \$19 @ \$21 for Gray Forge. These prices are f. o. b. at the port of shipment. Small spot lots will command \$2 per ton higher. Foreign Pig Iron has met with a fair demand, and is held 50¢ @ \$1 1/2 per ton higher than at the time of our last report. We quote Eglington at \$22 @ \$22.50; Gleggarnock and Gartsherrie at \$23 @ \$23.50; Coltness and Langloan at \$25 @ \$25.50; Middlesbrough at \$19 @ \$20. Old Rails are firm at \$26 @ \$28 for Foreign and \$30 for American. Manufactured Iron is in only moderate demand from store. Bar is selling at \$2.25 @ \$2.30 and common Bolt Iron at \$2.15. Norway and Swedish are unchanged at \$4.15 for Bars and \$5.15 for shapes. Nails are dull and weak, and though the list price is unchanged, the market has broken so that sales of round lots have been made at \$2.85. Plates are in fair demand at 3¢ for Tank, 3 1/4¢ for C. No. 1, 3 1/2¢ for C. H. No. 1 Shell, and 4 1/4¢ @ 5¢ for C. H. No. 1 Flange. Copper is quiet and unchanged at 18 1/2¢ @ 19¢ for Lake and 18 1/4¢ @



*(Austrian Trade Journal.—There has been a amelioration in the aspect of the Iron situation in Austria, causing prices to go on drooping still lower. But the fall has not been very great, and, on the other, causing dealers to operate with the utmost caution and hesitation, but in spite of all this prices are still higher than they are abroad. This does not benefit much our makers, however, for their expenses are comparatively heavier. As to the future, the fall has not induced our makers and here any prospects for much of an improvement in the near future. Some little consolation is drawn from the 25,000 tons of Steel Rails which our railroads will require in the near future. Pig Iron remains quiet, but due to the demand for Merchant Iron is not active. Only the best qualities of Iron and Steel are in a little better request. Wood presents a striking contrast to all this, tor*



both consumption and export are fully on a par with the capacity of product. P. S.—The North-western Railroad has bought Steel Rails in Germany at 144 marks, delivered at Tetschen, which is very low. Iron prices are upheld with difficulty here at 10 to 60 florins per 1000 kilos. For Pig, and 100 to 125 for Merchant Iron. Metals on the other hand, have been well sustained, especially Copper and Tin. We quote Copper, 65 @ 72; Tin, 110 @ 115; Lead, 21 @ 22; Spelter, 21.50; Antimony, 80 @ 81; Sheet Zinc, 28.50; Nickel, 4.50 per kilo.; and Zinc White, 34.50 @ 45 florins per 100 kilos.

## CHILI.

(Weber &amp; Co.)

VALPARAISO, Sept. 11, 1880.—Copper.—Notwithstanding the lower quotations from Europe prices have been firmly sustained, leaving to sales of 40,315 quintals at \$2 @ \$2.70 per quintal, and 15,000 quintals Regular at \$10.50, on board. Nitrate.—The settlement of the duty question is still kept in abeyance. It is not likely that the proposed reduction of the duty to \$1.30 silver per 100 kilos will pass. From October 1 next all producers may ship their Nitrate on paying the duty. Meanwhile there has been a lack of animation, since private producers have scarcely had any Nitrate to offer, and the government has made no further charters. Sales have been restricted to 100,000 quintals, 95 and 96 % Taltal, Iquique and Antofagasta at \$4.40 @ \$4.55 per quintal. Export in August has been, from Iquique, 401,752 quintals; from Antofagasta, 158,274, and from Taltal, 93,554; together, 653,580 quintals, of which 36,564 to the United States. There were loading at latest dates 223,700 quintals at Iquique, 42,000 at Antofagasta, 70,100 at Tocopilla and 115,000 at Taltal; together, 450,800. The shipments have been, from January 1 to August 31,

|                               | 1880.     | 1879.     | 1878.     |
|-------------------------------|-----------|-----------|-----------|
| Quintals. Quintals. Quintals. |           |           |           |
| To the North of Europe        | 2,115,838 | 2,101,662 | 3,516,062 |
| To the United States          | 472,294   | 193,722   | 379,379   |
| To the Mediterranean          | 22,033    |           | 97,701    |
| Total                         | 2,610,165 | 2,295,384 | 4,093,542 |

Exchange has been in moderate request at steady rates, improving to 26 1/2 to-day for 90 days drafts.

## AUSTRALIA.

(Mining News.)

BRISBANE, Queensland, Sept. 3, 1880.—Tin.—There has been within the past fortnight an extensive Tin field discovered in the Colony, situated about 30 miles from the coast, and about 200 miles North of Brisbane, about 20 miles Southwest of Gladstone, and 30 miles Northwest of Bundaberg, all ports on the Eastern Coast of this Colony. The nearest water carriage is up Baffel Creek, which is a small tidal river and has 6 feet water to within four miles of the prospector's lease. The Stream Tin is found on the banks of this Baffel Creek and its tributaries. The prospects are reported as 1/2 cent. to 1 cent. stream Tin to the ton of water. This is the fourth large Tin field now discovered in this Colony. The first and oldest, Stanthorpe, is turning out about one-third more at present than it did last year, owing to the high prices now ruling. The second, Cooktown field, is working well, Chinese being chiefly employed in raising and washing the Stream Tin. All this Tin is shipped from Cooktown and has been steadily increasing for the past 18 months, and now yields about 20 tons per month. The third, Cairns, to the South of Cooktown 400 or 500 miles, is now being actively worked, and turning out about 10 tons monthly. Both these fields will greatly increase their yield when the wet season comes in; thus we have large tin tracts extending from the Southern boundary of this colony to Stanthorpe, to the north of Cooktown, a distance of nearly 2000 miles.

(R. D. Adams.)

SYDNEY, NEW SOUTH WALES, Sept. 3, 1880.—Copper.—After the customary vicissitudes of most mining enterprises the Twelve Copper Mine has at last proved a success. Twelve months ago the shares could be got for 10; now they readily fetch 75 ex dividend. On the same general line of country are the Nimgage and Mount Hope Copper mines, which, although as yet only prospecting, give every indication of being also very extensive and valuable, and as the railway is going out yearly in that direction, cheaper transit will add still more to their value year by year. The output of the Cobarr Copper Mine from Jan. 12, 1878 to June 26, 1880, has been 479 tons of pure Copper.

## EAST INDIES.

(Gillilan, Wood &amp; Co.)

SINGAPORE, Oct. 2, 1880.—Tin.—Purchases for the fortnight are under 100 tons, mostly at \$6.25 per picul, at which there are still buyers, but dealers, having moderate supplies to handle, are not willing to sell. Shipments from the Straits to the United States last month were 200 tons, making, for the nine months, 655 tons, against 453 tons for the same period last year. Freight.—The supply of disengaged tonnage is rather more than equal to the demand and rates are weak. Since New York nothing has been done, and the Nancy Peniston is not yet a full ship. For Boston there have been no charters. Exchange is steady at 3/10 for 6 months' sight credit drafts on London.

According to the last wreck register of the British Isles published by the Board of Trade, the total number of wrecks on the seas and coasts of the United Kingdom during the last 25 years is not less than 49,322, and the whole number of lives lost therein amounts to the enormous number of 18,319. It is observable that for several successive years the number of wrecks varies hardly at all; thus in 1855 there were 1141 wrecks; in 1856, 1153; in 1857, 1143, and in 1858, 1170. The disasters of this sort then increase over those of the preceding years, but hardly vary among themselves, there being 1416 in 1859, 1379 in 1860, 1494 in 1861, and 1488 in 1862. In 1863 there was just one wreck less than in 1865, and the largest number was reached in 1877-78, when it was 3641. The register, however, shows that 3302 lives have been saved from wrecks by means of the National Life-Boat Institution, the rocket apparatus of the Board of Trade and other agencies, in conjunction with efforts made on board the distressed vessels themselves.

Of late some of the most beautiful mosaics, both in design and material, have been produced by Russian artists in the imperial glass manufactory of Russia, the artistic excellence of which, it is asserted, has never been surpassed. The pieces of glass—technically called "smalts," and comprising every possible shade of color—are wrought into minute pictures of wonderful perfection, rivaling, in fact, those of Italy. The varieties of mosaic work peculiar to the latter country are known distinctively as the Florentine and the Roman, the former being entirely formed of pieces of stone or shell of the natural colors, and chiefly applied to floral and arabesque designs; while the Roman is made of the glass smalts, and has so wide an application that most of the finest paintings of the best old masters have been copied in mosaic. The manufacture of the opaque glass (or smalts) required for making the little square pieces called tesserae, of which the pictures are composed, is a very important one, as many as 25,000 different shades of the various kinds of colored glass being produced at the Vatican.

Thirty heavy locomotives are now being constructed at the Pittsburgh Locomotive Works, 10 of which are for the Texas Pacific Railroad.

## INDUSTRIAL ITEMS.

MASSACHUSETTS.

At an assignee's sale of the piano manufactory of William H. Ivers, at Dedham, on Wednesday, J. F. Harlow bid in the manufactory to Ivers, Pond & Co., pianoforte manufacturers, for \$3510, it being \$10 over the mortgage. The business will continue on, as formerly, under the firm name of Ivers, Pond & Co., and the firm intends manufacturing 15 pianos per week.

J. W. Gardner, of Shellburne Falls, is erecting a new cutlery factory, which will furnish room for the employment of about 300 men.

The Hampden Paint and Chemical Company, of Springfield, have recently reorganized with E. P. Chapin, formerly treasurer and manager, as president, and E. K. Baker as treasurer.

For the week ending Nov. 3, South Abington shipped 742 boxes, 14 cases and 35 kegs of tacks, nails, shanks and eyelets.

The new brick shop just completed for the Emery Wheel Company at Leeds, Northampton, is 70 by 30 feet, and built to make more room for the manufacture of machinery, which has grown to be a large part of the business. It contains 20 ovens for baking wheels. Each oven holds about 75 wheels. The old ovens are taken out of the main shop.

NEW YORK.

D. Saunders' Sons, Yonkers, have shipped to W. C. Ellison's Tube Works, Philadelphia, a No. 5 and a No. 6 pipe-outting and threading machine.

Burdens' blast furnace No. 1 has started up again.

The iron furnace at Sterlingville is in full blast and using 900 bushels of charcoal a day. Most of the wood for five miles around is burned up already.

Elmira's Rolling Mill and Steel Works are crowded with orders.

PENNSYLVANIA.

The following is the record of the two furnaces of the Phoenix Iron Company, Phoenixville, for the week ending October 30, 1880: Product of No. 1 furnace, 281 19-100 tons of pig iron; anthracite coal consumed per ton of iron, 1 3/4-100 tons. Product of No. 2 furnace, 304 92-100 tons of pig iron; anthracite coal consumed per ton of iron, 1 22-100 tons. Previous to the rebuilding of these furnaces under the care of Mr. C. J. Rader, superintendent, the product did not average one-half of their present output.

The Brooke Iron Company, at Birdsboro, made 1820 kegs of nails in October.

The Isabella Furnace, in Berks County, which has been idle for some months, will, it is rumored, again be put in blast in a few weeks. During the time it has been standing idle a number of improvements have been added, besides the accumulation of a fair stock of charcoal.

Mr. Isaac Fegely, one of the principal members of the Warwick Iron Company, left yesterday morning for Lebanon, where he was in consultation with Mr. Peter L. Weimer in reference to the furnace repairs and improvements. He subsequently left for Clearfield County, where he arrived last evening, the object of his journey being to inspect several furnaces in the Clearfield district, and make an examination of the Clearfield fire-brick. Mr. Fegely is of the opinion that some article of fire-brick can be found which will prove superior to others for the lining of the Warwick Furnace. He has great faith in the Reading fire-brick, which is acknowledged by ironmasters to be unexcelled. The Warwick Furnace will be put in blast as soon as possible. Meanwhile the proprietors of other furnaces, who have been greatly interested in the experiments with the Warwick Furnace, will anxiously await developments.—Reading Times.

The Sheridan Furnaces are in full blast and doing well.

Total coal tonnage of the Philadelphia and Reading Railroad for the week ending November 6, 146,502 tons; corresponding week last year, 173,076; previously this year, 6,550,506; corresponding period last year, 7,562,591 tons. Decrease this year of 1,012,084 tons.

A charter was issued at the State department, Harrisburg, to the Combination Steel and Iron Company, formed for the purpose of doing business in the city of Chester. The capital stock is \$200,000, in shares of \$100 each.

Warner's Forge, at the Falls of French Creek, is again running on full time. The opening of the branch of the Wilmington and Northern Railroad to that place has been of great benefit to the iron and mining industries of that portion of the country.

The Bechtelsville Furnace turned out 23 1/2 tons of pig iron last week.

The coal product of the Schuylkill region for the week ending October 30, was 163,940 tons, as against 175,621 tons for the week previous, and 160,174 tons for the corresponding week of last year. The total product for the week was 641,789 tons, against 577,060 tons for the same week of last year—an increase of 64,729 tons. The total output for the year is 19,183,119 tons, against 21,811,807 tons for the corresponding period of last year—a decrease of 2,627,686 tons.

Work has been resumed at the rolling mill of Potts Bros.' Iron Company after a two weeks' suspension. There is a rumor that a company has been formed for the erection of a rolling mill on the site of the old pipe mill in the eastern part of Lebanon. Messrs. Robert H. Coleman, A. Wilhelm, D. S. Hammond, C. B. Forney and others are said to be interested in the enterprise. The ground has been staked off and work is to be commenced immediately.

The Pottsville Iron and Steel Company are a new concern for the manufacture of iron and steel at Pottsville. This is a large corporation. The capital stock is \$450,000, in 9000 shares of \$50 each. The president is Charles M. Atkins, with William Atkins as treasurer, and they, with David C. Henning, form the Board of Directors.

The furnace of the Warwick Iron Company, which went out of blast last Sunday week, has been entirely cleaned, and it was found that the brickwork from the bosh to the tuyeres had been melted out, being in the same condition exactly as it was after the famous two years' run, and also after a later blast of ten weeks. In such a shape com-

petent judges say no furnace could work. During the short blast mentioned, 3800 tons of iron were made in less than ten weeks, of which 1000 tons were foundry iron. During the last blast, of less than nine weeks, 3500 tons were made, all of which is gray foundry iron, except 250 tons of No. 3, showing that the probability of melting out is equally as great with foundry iron as with mill iron. These facts conclusively disprove the theory that the furnace had been pushed, it being impossible to make foundry iron when a furnace is blown beyond its capacity.

It is reported the Philadelphia and Reading Railroad has made a contract with the Standard Oil Company for the transportation of the latter's oil. By the terms of this contract the Standard will build its pipe line only from Bradford to Milton, instead of to the seaboard, as contemplated, and oil will be conveyed from that place to the Standard's large refineries at Communipaw by rail. It is understood the Reading Company will receive such low rates for compensation as to leave a very small margin of profit, if any.

An application has been made to the State Department for a charter for the Cresson Coal Company, formed for the purpose of mining coal at Cresson, Cambria County. The office of the company will be in Philadelphia. The capital stock is \$200,000, divided into 4000 shares of \$50 each. Philip F. Kelly, of Philadelphia, is treasurer, and the directors are George F. Huff, Greensburg; B. K. Jamison, William M. Stewart, J. H. Kershaw and Thos. Collins, Philadelphia.

PITTSBURGH AND VICINITY.

Preparations are being made at the Black Diamond Steel Works of Park Bros. & Co. to cast the first steel shaft for steamboats ever manufactured in America. Heretofore such shafts could only be made at Krupp's famous works in Germany, and it was only last week that a Pittsburgh tow-boat, the Joseph B. Williams, was supplied with one of these shafts, transported especially for it from Germany, and placed in the boat at Cincinnati. Since the immense steam hammers have been cast at the Black Diamond Steel Works, Pittsburgh will also be able to cast these large shafts, saving to steamboatmen the cost of transportation from Germany. Pittsburgh is the only place in the United States where such immense work can be turned out.

McKee & Bros., Eighteenth street, Southside, are still very busy, selling all the ware they make, and unable to catch up with old orders. Considering the large number of new factories and the great increase in the aggregate of ware produced in the country, the firm are entirely satisfied with the business they are doing.

The demand for tubes at the Aetna Pipe Mill is so large that the managers find it necessary to employ another crew of men in addition to the two crews which have been working day and night. Constant employment could be given to all of their pipe mill hands, day and night, if sufficient gas could be obtained. The last set of men employed commenced at 12 o'clock, noon, which enables them to get gas from the heating furnaces in the rolling mill. Their turn is completed early in the afternoon.

Messrs. Oliver Bros. & Phillips are adding a plate plant to their works on Tenth street, on the Southside. The roll train, for which Garrison & Co. have the contract, will be of the Lauth three-high type, the top and bottom rolls being 25 inches in diameter and the middle one about half that size. The engine is being made by Robinson, Rea & Co., and the shears (40,000 pounds) by J. L. Lewis.—Daily Dispatch.

The Richards & Hartley Glass Company, Pride and Marion streets, are fully employed, orders being largely booked ahead, so that no goods accumulate in warehouses. Their trade has been steady, and bids fair to continue so for some time to come. They are running mainly on staples, but have some novelties for the holiday trade.

The Lamp Chimney Manufacturers' Association of the United States met on the 10th inst., in the Monongahela House, parlor No. 4. The meeting was well attended, representatives of the trade coming from New York, Brooklyn, Boston, Philadelphia, Steubenville, Bellaire and Ravenna, Ohio, White Mills and all places in Pennsylvania where lamp chimneys are made. Mr. James Gillender, of Philadelphia, presided, and Mr. Vankirk was secretary. The meeting was held with closed doors, but so far as could be learned, the proceedings were harmonious, and, generally speaking, the members' views were about the same. Figures showing the amount of stock on hand were submitted yesterday, and after the situation had been reviewed in every aspect possible, it was decided that there was but one measure for relief, and that was to restrain production. A resolution to shut down all the factories in the country for four weeks preceding January 10, 1881, was adopted.

The much-talked-of new glass works at Rochester have at last become a reality, the capital stock all subscribed and the ground for the erection of the building purchased. The new company is to be known as the Rochester Flint Vial and Bottle Works, Limited, with a capital stock of \$20,000, 40 per cent. of which has already been paid in. The new works will be located at the intersection of the Ohio and Big Beaver rivers, commonly known as "the Point," where the ground has been purchased for the sum of \$2500. The works will have a river frontage of 180 feet, and the shipping facilities, both by rail and water, are unsurpassed. Prescription vials and bottles will be manufactured exclusively, in which a large force of workmen will be employed.

Up to the 10th inst. 128 heats had been melted in Hussey, Howe & Co.'s Siemens-Martin open-hearth furnace without a break for repairs. Present indications are that the furnace will be good for a dozen more heats before repairs are necessary.—Daily Dispatch.

Ripley & Co., Eighth, Ninth and Bingham streets, Southside, are doing a heavy business, requiring the full output of their factory to meet the demand.

We learn that the great anvil block cast several weeks ago at the Black Diamond Steel Works has cooled off sufficiently to permit the workmen to place it in position. Soho Furnace made during October 3514

271-2268 tons gray forge pig iron. The last week in the month the product was 862 1274-2268 tons.

Evans & Co., Southside, are running their large furnace to its full capacity, and making handsome chimneys, &c. Trade is still very fair with them, there having as yet been no rush of orders, but they expect one soon.

WEST VIRGINIA.

Belfont Mill shipped 3500 kegs last week and 3000 kegs to-day, to St. Louis. The wareroom has a small exhibition of stock.—Wheeling Intelligencer.

The Benwood Mill is running full in all departments, except the blast furnace. Nails are being shipped as fast as made, and the prospects for a good trade are fair.

The Acme Glass Factory, Steubenville, is running to its fullest capacity, with good prospects.

The Riverside Blast Furnace was blown in last week, and iron is now being made. The forge department of the Riverside Mill went on double turn on Monday, and the nail factory is also on full.

OHIO.

The Pump Works of Messrs. J. H. McGowan & Co., of Cincinnati, are running with a full complement of hands, making 12 hours per day, working almost exclusively upon "Rival" pumps. Over 1700 of these pumps have been turned out of this establishment within the past three years, between 700 and 800 of which have been shipped during the present year. The company ship 15 Rival pumps per week to one house in Mansfield, and are at this time 120 pumps behind their orders. Such has been the necessity for a larger capacity of their works that they are now building a new factory 87 x 40 feet, 4 stories high. Besides pumps, this firm turns out a large number of tobacco machines which they are shipping to all parts of the world. They are now shipping tobacco machines to Hamburg direct.

The blast was turned on the Ironton Furnace on the 6th inst., after a rest of three years. She started off beautifully, making at the first cast 11 tons of No. 1 foundry iron. She was started on all native ore and West Virginia coke. The company, having built 60 coaling ovens on New River, will continue to supply their furnace from their own ovens.

The Aetna, having stopped for the want of coke, will start up again about the 1st of December. The late rise in the river having enabled the company to get in a supply of coke, it is expected that she will run straight through the winter without interruption.

Inquiries for bar are more lively at the Lawrence Mill, Ironton, but it is hard to get off their product. The rate at which iron is now sold there is 2.15. The mill department is running double now. The forge stopped until after election, as the stock of muck bar was somewhat ahead of consumption.—Trade Review.

At Martin's Ferry the Buckeye Glass Works are making large quantities of glass, and a good sale is found for it nearly as fast as made.

The Bellaire Nail Works, blast furnace, &c., are running to their full capacity. There is a fair demand for nails, and quite a large quantity have been shipped South and West by reason of the rise in the river. The new building to be used for warehouse and office purposes is being completed as rapidly as possible.

The Ohio Furnace has completed hot-blast repairs and is again in blast. She will not blow out before March.

The Latrobe, working badly all the season, was recently blown out and repaired under the supervision of Robert Hoop, who blows Richmond. New hearth was put in, new chimney built, and change made in hot blast. Furnace now doing well.—Greenup Independent.

The blast furnace of the New York and Ohio Iron and Steel Co., at Ironton, went in blast on the 4th inst., and is doing well, averaging about 35 tons per day. Steam was raised in the company's mill, and three furnaces—the muck, rolls and the sheet mill put in operation on the 11th instant.

The Belfont and Sarah are working well making about their usual product.

ILLINOIS.

The plow manufacturers, at their meeting held at Peoria, adopted a new list for the season of 1881. They increased the list price of several grades of plows, and hold the discount on all wanting plows and fixtures at 30 per cent.; sulkeys are on a basis of \$41 for 16-inch, with hand lift and all, payable July 1, with the usual discounts for cash. Where sales exceed \$500, an extra discount of 5 per cent. is allowed; on cultivators, wood-beam walking cultivators are put at \$17, net, and iron beams \$1 higher; combined cultivators, \$25; and riding cultivators, \$26; all payable October 1, with the usual discount for cash. Where sales exceed \$500, 2 1/2 per cent. additional discount is allowed, and where the amount reaches \$750, the discount is set at 3 1/2 per cent. All the factories agree to make a sworn statement on the 10th of each month. Each concern puts up a forfeit, and in case of any violation of the agreed prices, the money reverts to the association.

The Secretary of State has issued a license to organize to the Kasterbion Type Setting Machine Company, of Chicago; capital, \$45,000. Incorporators: John Marder, A. P. Lase and Carl Miller—all well-known citizens.

The celebrated Corliss engine is rapidly being placed in position at the Pullman Works, at Pullman. It is expected that it will be in working order by December 30.

B. Davies & Bro., contractors and manufacturers of silver-smelting furnaces and all descriptions of boilers, inform us that they have all they can do in their line and employing all the men they have capacity for. They have a contract with the Union Iron and Steel Company, at Thirty-first street, near Ashland avenue, for lining all 494 furnaces. Their works are located at 494 Twenty-sixth street, Chicago.—Journal of Commerce.

Benson & Gillett's extensive tile works, Aurora, were burned last week. They will be rebuilt.

Eaton & Prince, manufacturers of general

machinery, are manufacturing a quantity of barbed-wire machinery—capacity, 10,000 pounds per day—to be sent to the Hazzard Mfg. Co., of Wilkesbarre, Pa. They are also constructing four barbed-wire machines for the Hawkeye Mfg. Co., Burlington, Iowa. They run their factory overtime, and are three months behind their orders.—Industrial World.

Mr. William Deering, Chicago, manufacturer of the new Marsh harvester, recently shipped a number of twine binders to England.

The Orvis Smoke Consuming and Fuel-Saving Company is a new corporation recently established in this city, for the manufacture and sale in the State of Illinois of the Orvis' Smoke Consumer. The following is the list of the officers of the company: W. C. Grannis, vice-president Union National Bank, president; Benj. Allen, wholesale jeweler, vice-president; F. G. Saltonstall, stock broker, secretary and treasurer. The directors are O. D. Orvis, W. C. Grannis, Benj. Allen, F. G. Saltonstall and A. F. Noble. A stock company has been formed in Cleveland for the sale of the Orvis smoke consumers in Ohio, and another is being formed in St. Louis for the control of the sale in Missouri. We also understand that the right to manufacture the Orvis smoke consumers in the State of Louisiana has been sold to parties there who intend to form a company for that purpose.—Chicago Industrial World.

KENTUCKY.

The Norton Furnace is making an average of 50 tons on all raw coal, mill cinder and native ore.

Mr. J. S. Woolfolk and L. Hood have leased the Mt. Savage Furnace property for five years, commencing February 1, and will soon begin cutting cord wood for next year's blast.

We understand that the Princess Furnace stack, with hot blast, machinery, &c., is to be removed to Ashland shortly and put up below the Ashland furnace, the supply of coal and native iron ore to be supplied from the Princess Furnace lands.

The Iron Hills Furnace was sold at Grayson last Monday week for \$25,000, the face of the mortgage held against it. It is probable it will be sold to other parties, who will put the furnace in proper shape to commence operations. This property represents a first expenditure of \$315,000.

ALABAMA.

The Birmingham Rolling Mill is working full force; product not stocked, but shipped as soon as made.

The Alice Furnace is now complete. The stack is being dried and the coke ovens near furnace are being heated up. As soon as sufficient stock of coal and coke is on hand the furnace will be charged and blast put on.

TENNESSEE.

James C. Warner, James P. White, L. S. Goodrich, Percy Warner and J. P. Williams, have filed with the County Court Clerk of Nashville an application for a charter incorporating the Warner Iron Company. This company will at once erect a furnace in East Tennessee for the smelting of ores. The exact location of the plant we do not as yet know.

NEBRASKA.

The Omaha Iron and Nail Works, of Omaha, claim a nominal capacity of 200 kegs per day, but under the stimulus of a surplus of orders are now turning out about 1400 kegs per week, or six days. They use scrap and old rails to make their nail plate. Their coal is brought all the way from Wyoming Territory, and costs delivered \$6 per ton, from which they have salvage in slag or cinders, which they sell to the silver smelting works at \$2.25 to \$2.57 per ton, and another smaller one in coke washed from the ashes. Their market lies entirely to the West, much of their product going to the Pacific Slope, and some being exported. A single shipment recently was an order of over 500 kegs to Japan. In this territory, freights are a large factor in their favor. Additions are now projected which will largely increase their product. New self-feeding machines are to be added shortly, and some of the old ones changed to self-feeding, with a view to the largest possible production. The company operating the works is a local one, G. T. Walker being superintendent and R. M. Wilson, assistant.

The fire-damp explosion in the Foord Pit at Stellarton, N. S., is one of the most serious calamities of the kind which has happened on this continent. The great number of our mines are still shallow, and do not contain those vast areas of goaf and broken ground which are so dangerous to the safety of collieries which have been wrought for long periods of time. Still, our mines in some districts are more and more approaching that condition, and the explosion in the Dominion may prove the first of a series of calamities of magnitude during the next decade, unless the question is more closely studied than it has been hitherto. From present information, it appears that the ventilating machinery of the Foord Pit was rather better than that of the majority of our coal mines, and the only theory advanced until now to account for the disaster, is the familiar one of a defective safety lamp. Until full and accurate details are forthcoming, such as we expect from Mr. Gilpin, the Government Inspector of Mines, no effort can be made to trace the cause of the calamity. One fact in connection with the explosion is worthy of note. The first two explosions occurred in rapid succession, on the morning of the 12th inst. They apparently set fire to the mine, and late at night on the 13th the accumulated gas in the mine exploded with terrific force. A few hours afterward another occurred, and after a long interval this was followed by a large number in rapid succession, until the flooding of the mine had progressed sufficiently.

The following is the latest of the mining stories which have come to our notice: A miner had a wonderful ride in a tin pan in Colorado. Being at the top of a mountain, and desiring to get to the bottom of the valley, he knew that a tedious and circuitous walk of 15 miles was necessary by the







ordinary route, while the distance straight down the snow-covered mountain was only three. He had such a pan as miners used in washing out gold. Squatting down in this, away he went, faster and faster until the solder of the vehicle was melted by friction, and he was almost insensible from lack of breath. But the trip was quickly over without any mishap, and the passenger now declares that he enjoyed it. People with no appreciation of a story would ask whether the pan, when made so hot by friction as to melt the solder, did not raise blisters on that part of the miner's person in immediate contact with it; but it is not well to inquire too curiously into such matters.

#### The Death of Col. Drake.

The death of Col. E. L. Drake, the first man to sink a well in Pennsylvania in search of oil, and the pioneer in the petroleum business of that State, is announced as having occurred in New Bethlehem, Penn., on Monday last. Like the majority of the early operators in oil, he made a fortune, lost it, and in his declining years found himself in poverty. Unlike many of the same class, however, he was not reduced to abject want, for the State of Pennsylvania, recognizing the benefits which she had derived from his ingenuity and enterprise, granted him a pension, which has been the support of himself and family now for several years.

It was by the merest accident that Col. Drake's attention was first directed to the value of petroleum in 1858. Half a century before that date old Nat Carey had peddled the peculiar oil which was skimmed in small quantities from the waters of Oil Creek, and had paraded its virtues as a purgative and liniment. He called it Seneca oil, from the fact that Red Jacket, the Seneca chief, had imparted to the whites the secret of its powers. Its fame as a medicinal agent was purely local when Carey, with vials of the stuff, plodded from hamlet to hamlet and established a demand for it that brought him no small profit. An attempt by Gen. Franklin to introduce this "great natural medicine" to a Southern market later on ended disastrously, the Baltimore merchant to whom a wagon-load of it was consigned dumping it into the Chesapeake Bay, unable to endure the odor which it sent forth, and unwilling to believe that his Southern customers could accustom themselves to the remedy, no matter what the nature of their ailments. Northern patients, however, took more kindly to it, but among them even it was known more as a liniment than as a medicine.

For several years, until 1858, a firm in this city, Evelith & Bissell, had received from Titusville, Penn., about a gallon of this oil a day, which, mixed with other ingredients, they sold as the then celebrated "Mustang Liniment." Their supply of oil was gathered in the very primitive method of dipping blankets in a spring permeated with the article and wringing them into pans. This spring was owned by the firm, and when they were unable to meet their indebtedness to persons in New Haven, Conn., the latter took the Titusville property in payment. This was in 1858. Col. Drake was then a conductor on the New York and New Haven Railroad. His shrewdness had already attracted the attention of the owners of the newly acquired property. They sent him to Pennsylvania to perfect their title to it. He became satisfied from his observations that Seneca oil was possessed of more properties than had ever been credited to it, and that a fortune was in store for the man who could secure it in any quantity. He suggested the idea that the oil could be obtained in paying quantities by sinking a well. He was laughed at as a lunatic by the Pennsylvanians. Returning to New Haven he succeeded in interesting some capitalists in the novel theory, and in organizing the Seneca Oil Company, of which he was appointed manager. In the Spring of 1859 he commenced sinking a well on Watson's Flat, at a spot about a mile below Titusville. The move was considered so ridiculous that it was only with the greatest difficulty he could hire assistance in the work. He finally secured the services of an old salt-borer named William A. Smith and his two sons. The boring of the first petroleum well was begun on the 1st of July, 1859. When the three men quit work at sundown on the 29th of August they had drilled to a depth of 60 feet 6 inches. The elder Smith was first at the hole the following morning, and to his astonishment it was filled with oil. A barrel of it was dipped out in a few minutes, and the news of Col. Drake's sanity ran like wildfire up Oil Creek Valley. The discovery was flashed over the country, and then began the ever memorable oil excitement which made and beggared men before it subsided. To-day the oil region is honeycombed with wells, the supply of petroleum far exceeds the demand, and farmers who own no oil stock are skimming, from the waters of the same creeks over which old Nat Carey labored, hundreds of gallons of the stuff which is running to waste.

Col. Drake continued his operations in petroleum until 1864, when, broken in health and ruined in pocket, although at one time he had amassed a princely fortune, he abandoned the oil fields. In 1873 the State granted him a pension of \$1500 a year, payable to his wife in the event of her surviving him. He settled in New Bethlehem, where he spent the last years of his life a confirmed invalid. His co-pioneer, Smith, still lives in Butler County, Penn., destitute, and with a large family on his hands. A statue to Col. Drake's memory is to be erected on the new Oil Exchange now being built in Titusville.

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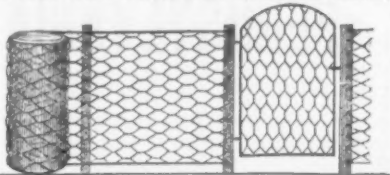
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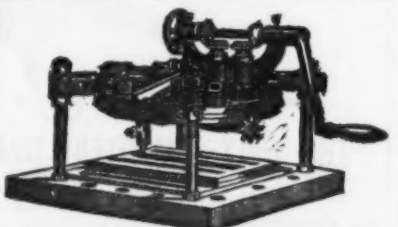


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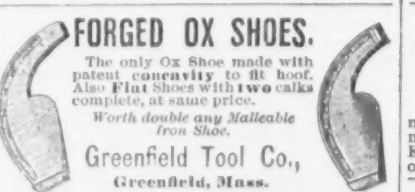
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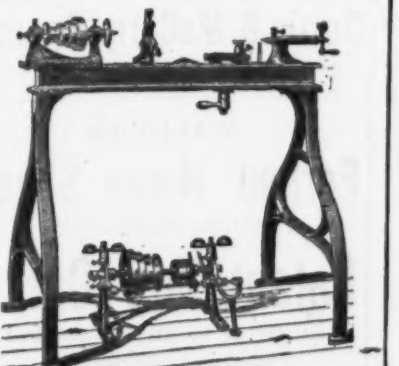


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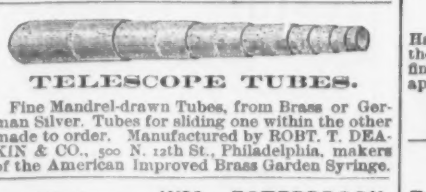
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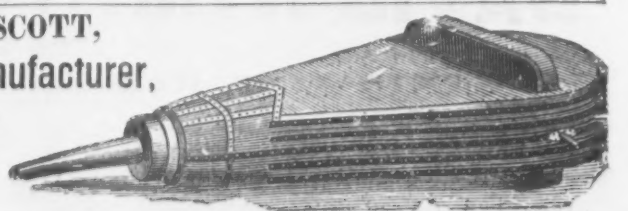


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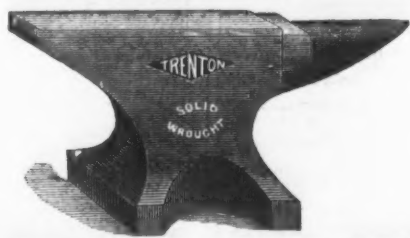
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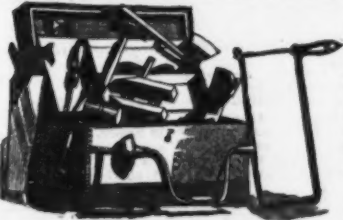
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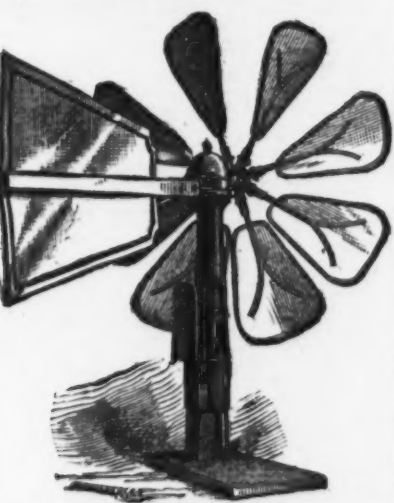
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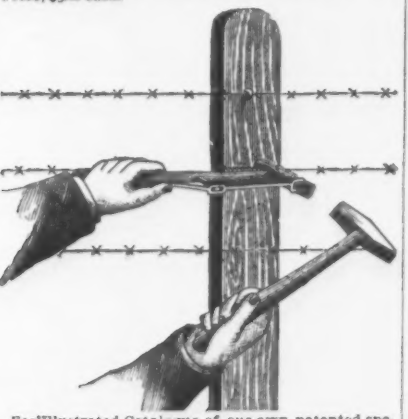


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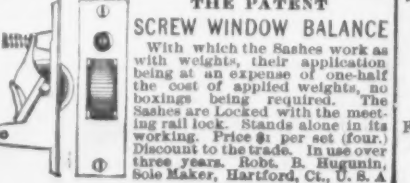
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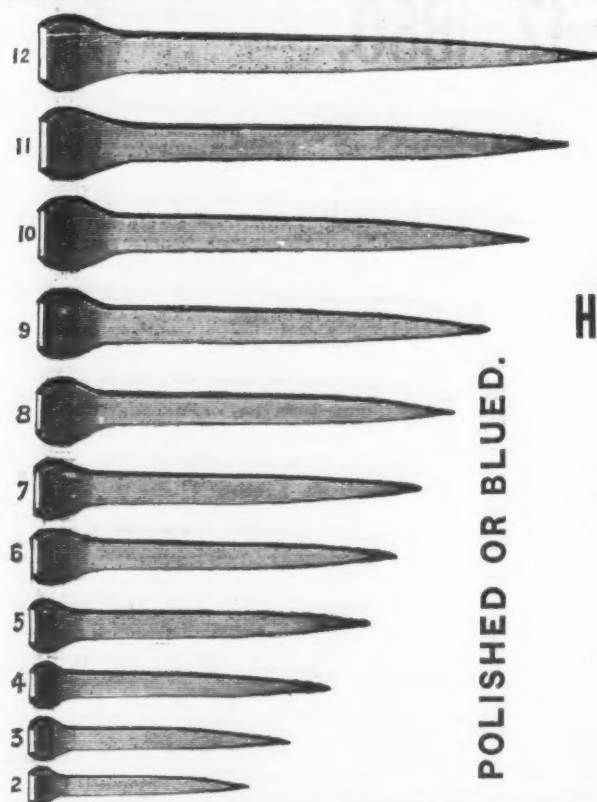
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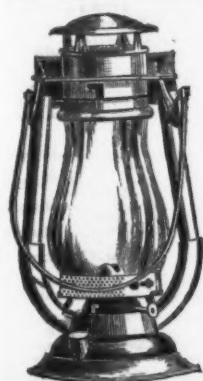
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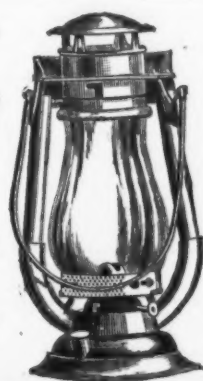
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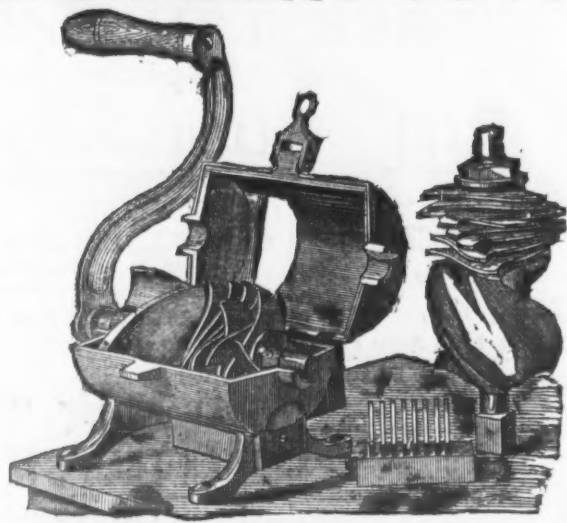
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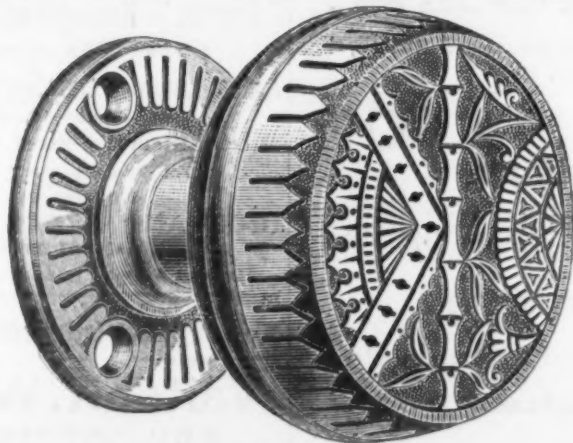
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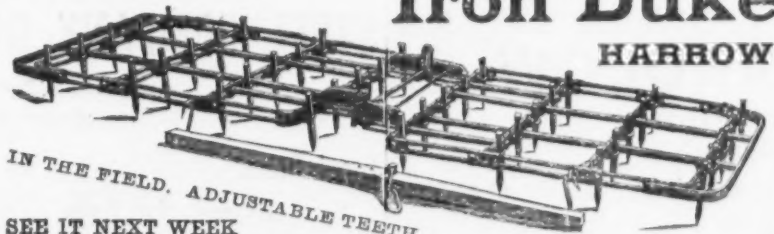
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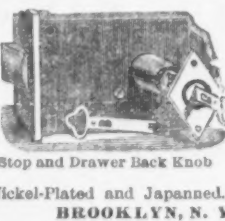
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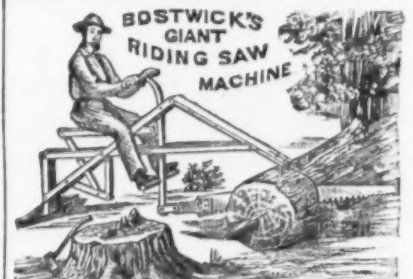
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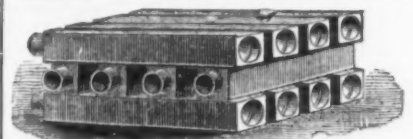
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See Page 3.

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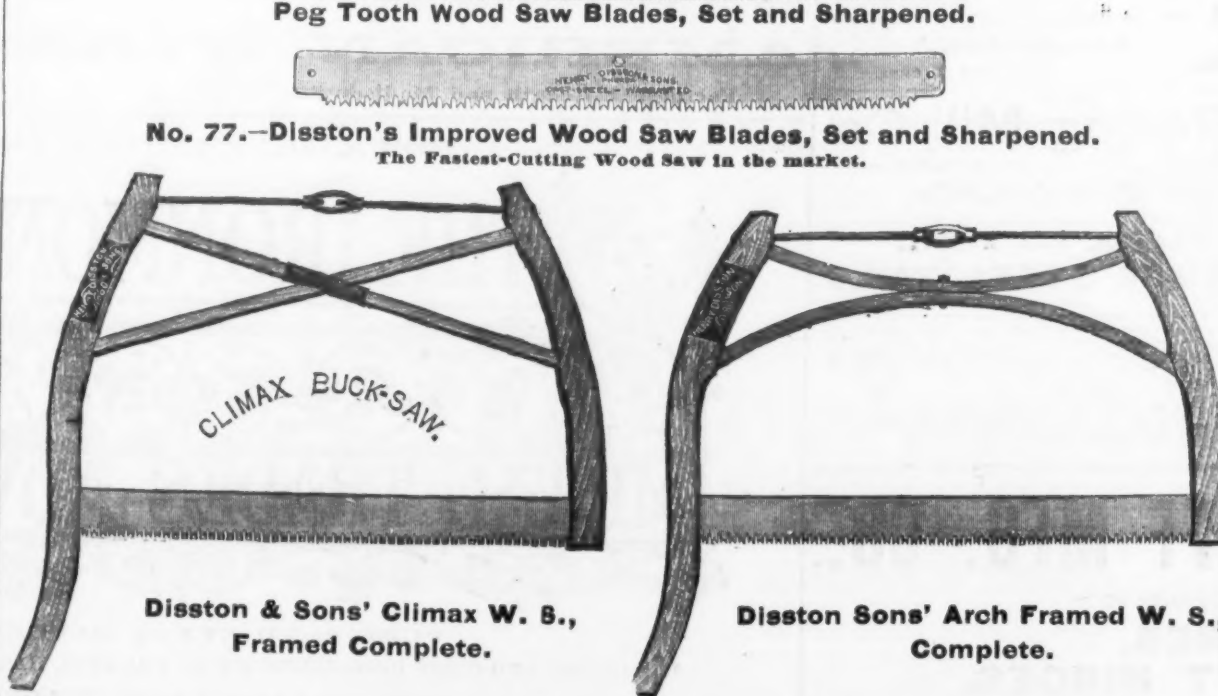
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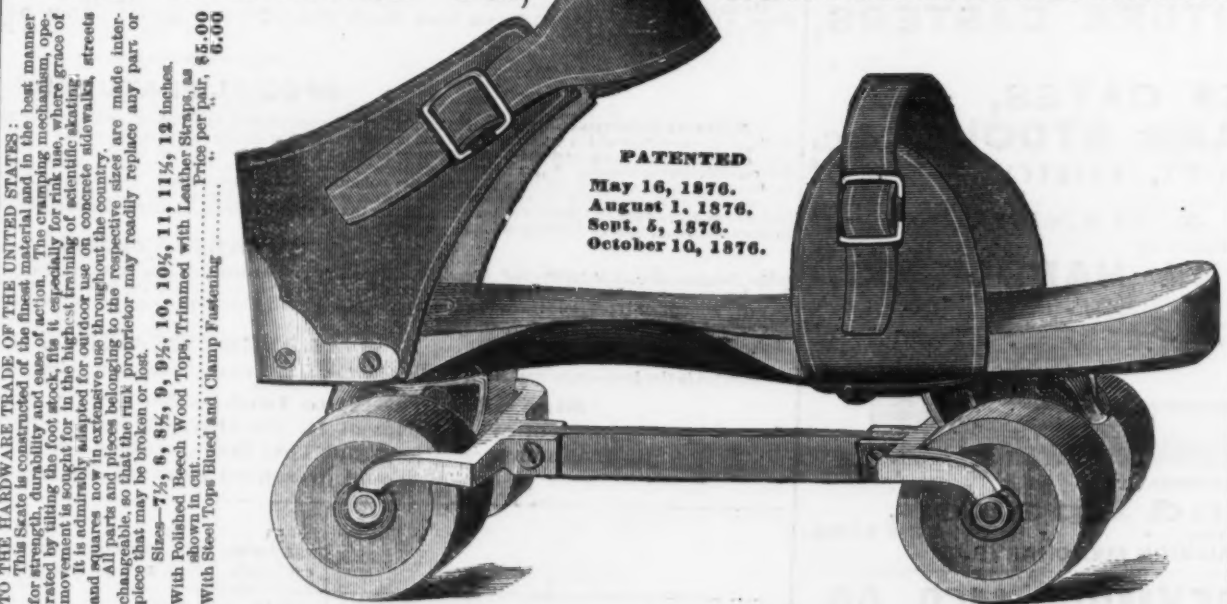


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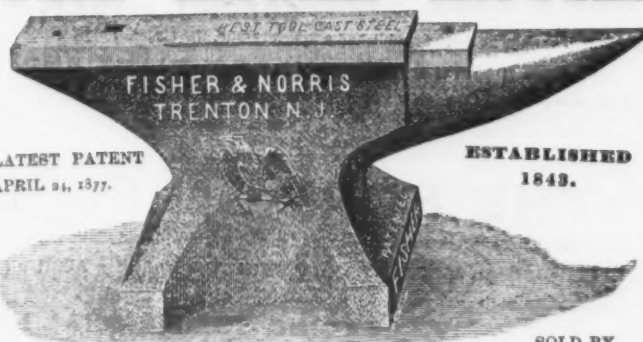


PATENTED  
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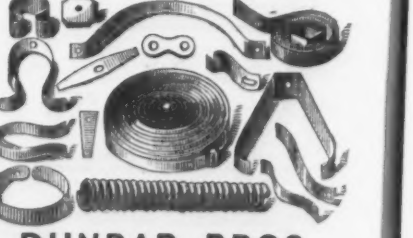
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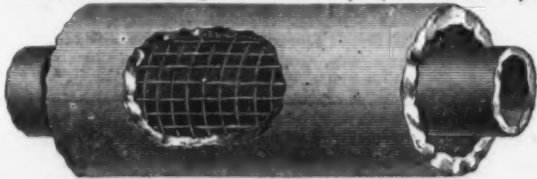
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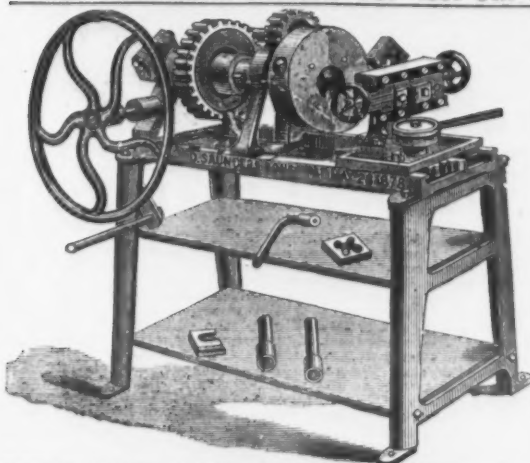
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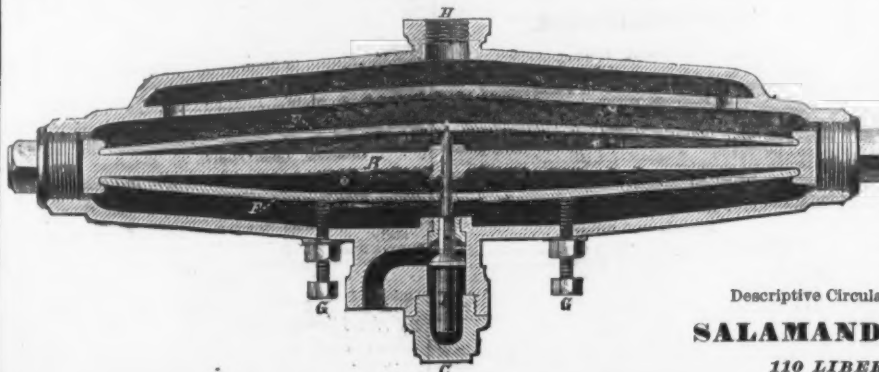
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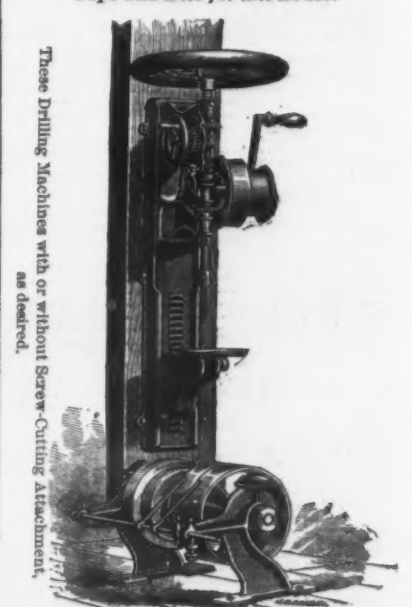
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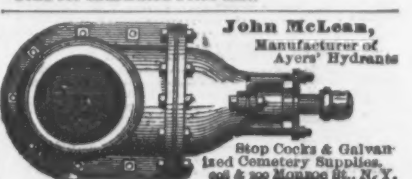
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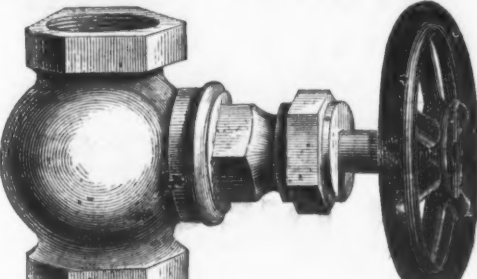


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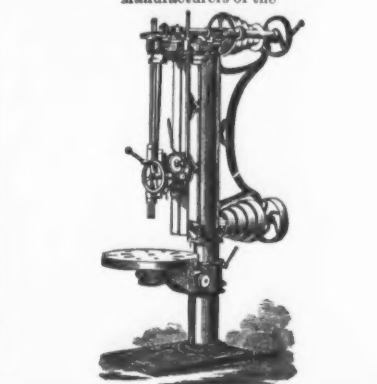
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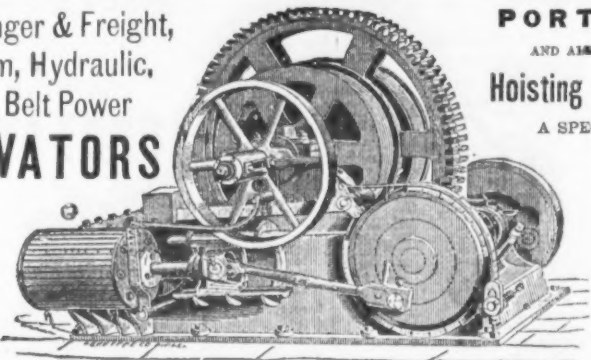


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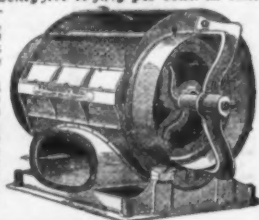
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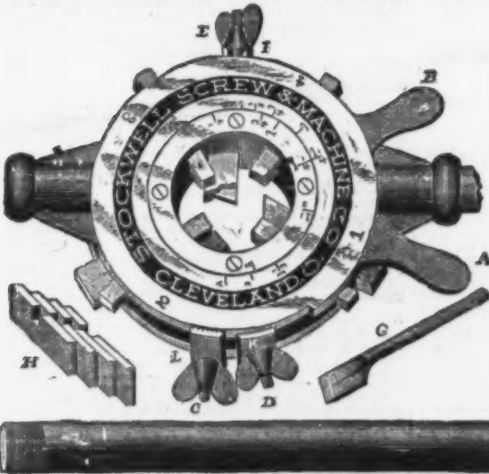
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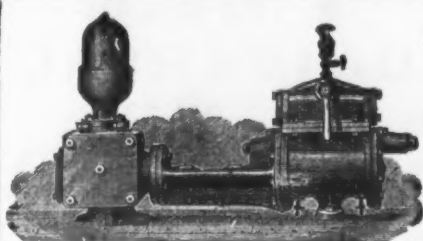
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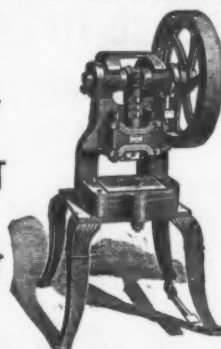
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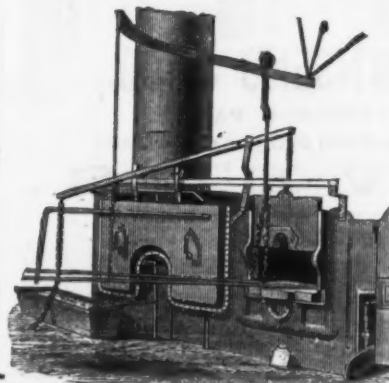
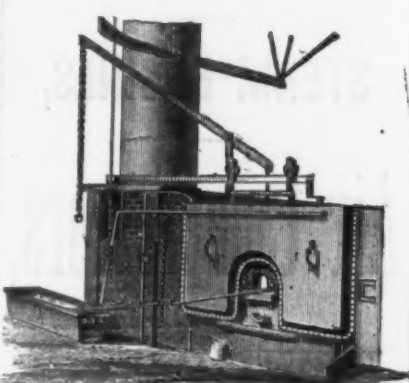


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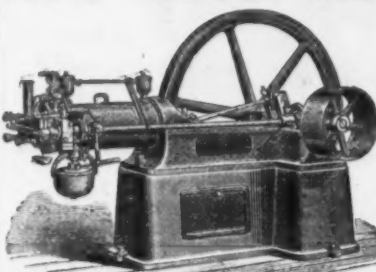
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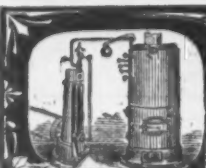
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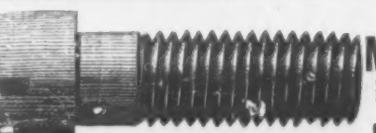


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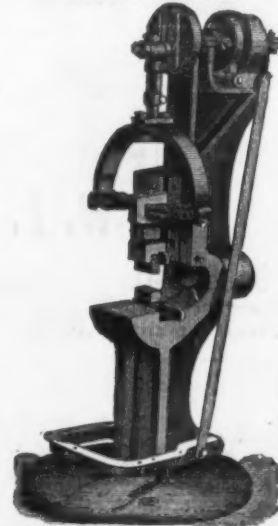
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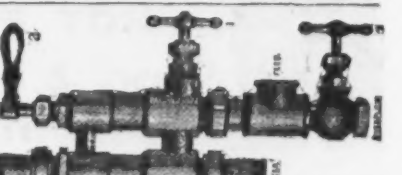
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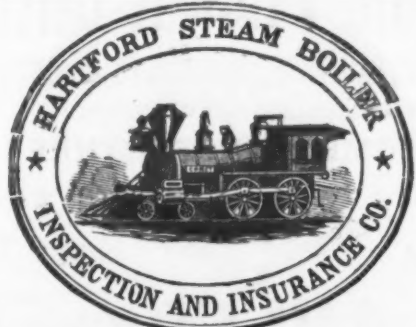
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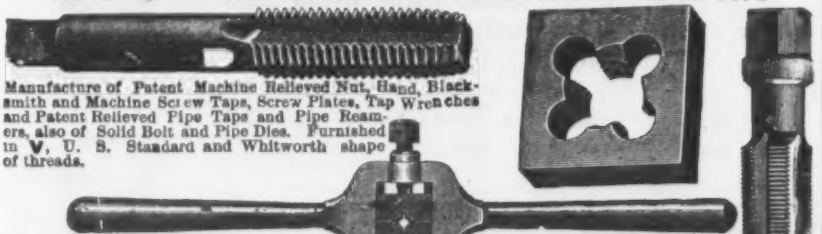
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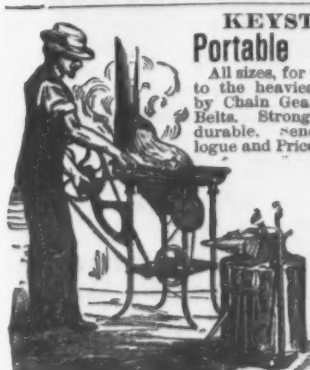
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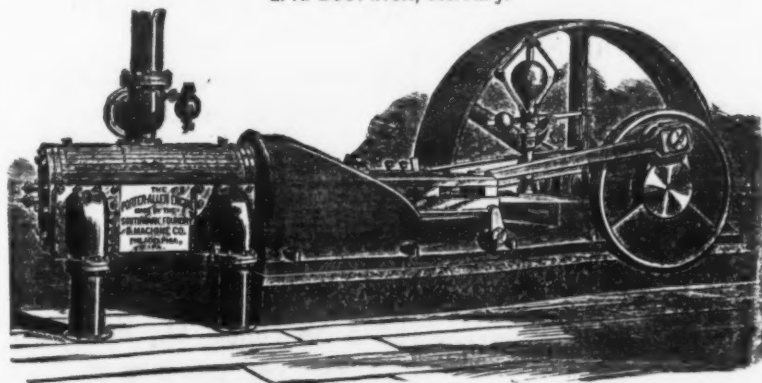
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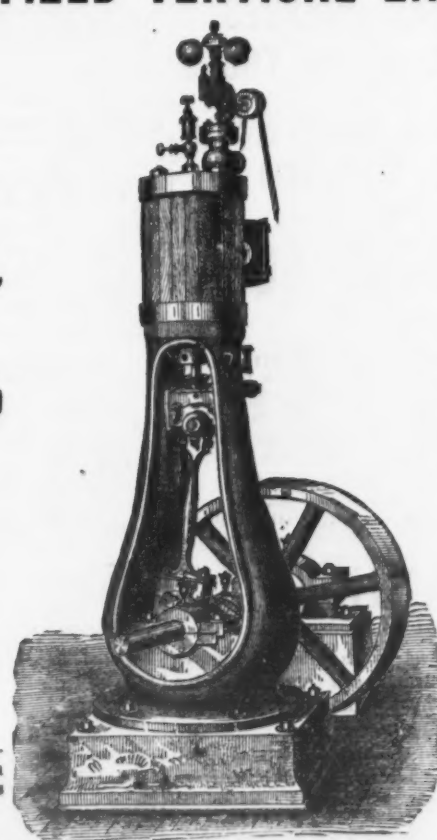
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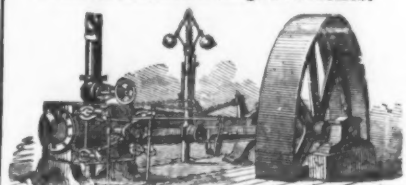
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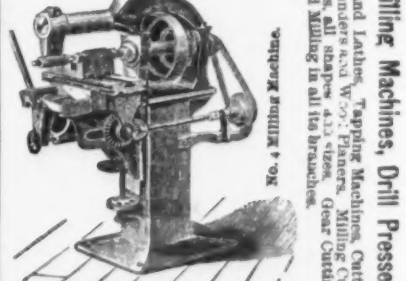
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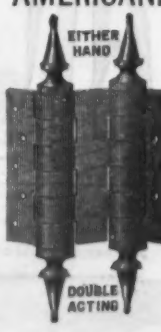
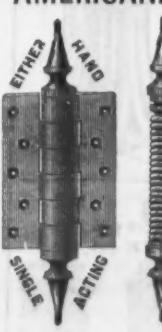
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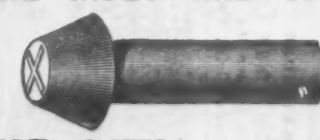
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